ARCHIVES OF OPHTHALMOLOGY.

THE OCULAR MANIFESTATIONS ASSOCIATED WITH ACNE ROSACEA, WITH THE REPORT OF A CASE OF SO-CALLED ROSACEA KERATITIS.

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(With one illustration on Text-Plate X.)

ACNE rosacea is an essentially chronic affection of the face, usually affecting the middle two-thirds, and is characterized by a congestion which, according to Crocker,[1] begins in the deeper vascular layer of the corium and later leads to permanent dilatation of the vessels, with new-vessel and connective-tissue formation and changes in the sebaceous glands. Crocker looks upon these manifestations as a vaso-motor reflex neurosis, and states that Schwimmer regarded it as a trophic neurosis on what appeared to him as inadequate grounds. Unna believes it to be a seborrhœic process, and classifies it among the eczemas. Pusey[2] describes it as an angio-neurotic affection, and states that it is essentially a chronic reflex flushing of the face. To call attention to the serious ocular involvement that may occur in some cases of acne rosacea, the following history seems worth recording, as it illustrates not only the extensive corneal type of the affection, but also the milder type, which fortunately is probably the one most frequently seen.

Mrs. G. A. M., æt. 29, first consulted me May 14, 1909, complaining of an inflammation of the right eye, severe enough to prevent sleep during the preceding few nights.

[1] Textbook of *Diseases of the Skin.*
[2] *Ibid.*

Her parents and three brothers were living and in good health; one sister had died in infancy. As a child the patient had a mild attack of typhoid fever, and at the age of fifteen developed "diabetes," which persisted for about three months. She first menstruated at the age of fourteen, and from the onset her menses tended to be irregular and of variable duration, but always accompanied by pain. This continued up to the time of her marriage at the age of eighteen. Since girlhood she has had a slight yellowish leucorrhœal discharge, while in recent years vague pains in the pelvic region on the right side have been present. At times there have been mild attacks of indigestion. She has had four children, the youngest a breast-fed infant of four months. Owing to headaches, she was refracted four years ago by an optician, when a +.50 s.⊖+.50 c. axis 90° was given for each eye.

The present ocular condition developed two weeks ago and has progressed despite treatment. She has had two previous attacks similar to this, though less severe, the first, over three years ago, the last in 1907. Examination of the right eye revealed marked photophobia, with blepharospasm and profuse lachrymation; the lids were red and swollen, the margins thickened and nodular, the lashes matted, and upon removal of the crusts, the lid margins, especially the lower, revealed several small ulcerated areas. At the outer canthus was a painful fissure. The palpebral conjunctiva was moderately inflamed and velvety, and a slight muco-purulent secretion was present. The bulbar conjunctiva was intensely injected below, so that the whole lower half of the eye presented a uniformly red color. In the upper portions this injection was much less evident, and here could be noted a distinct injection of the episcleral vessels. Laterally and above, a moderate pericorneal injection could be distinguished. The whole lower quadrant of the cornea was occupied by a vascular, superficial, dense, grayish-white infiltrate which began at the limbus and extended almost to the middle of the cornea and completely concealed the underlying iris. The most advanced central portion of this infiltrate sent a spur up and out, and another from the inner side projected up and in, the latter being the larger. At places the surface of this area seemed to be slightly elevated, and the whole infiltrate was coursed by vessels that could be traced from the limbus and terminated in the lateral spurs. At the apex of the inner spur was a small circular ulcer 1½ by 2*mm* in diameter, the centre being occupied by a tiny yellowish plug; a slight epithelial defect could be demonstrated at the apex of the outer spur, but with fluorescein

the staining was much less marked than that over the above-mentioned ulcer. In the central portion of the infiltrate could be noted three pin-head-sized yellowish-white dots which failed to take the stain. The remaining portions of the cornea were distinctly hazy, and in the upper and outer portion were several superficial, thin, grayish-white punctate infiltrates. The iris was distinctly hyperæmic, the pupil contracted to $2\frac{1}{2}mm$. The tension was normal. Vision $=\frac{1}{6}$. In the left eye the lids were reddened and a few marginal scales were present; the palpebral conjunctiva was hyperæmic, the episcleral vessels somewhat overfilled, while a fine injection existed along the lower corneal border. Situated on the lower limbus were three tiny discrete elevations resembling phlyctenules. In the cornea midway between the centre and the lower and inner border was a facetted macula, *2mm* in diameter, with a smooth, glistening surface. Down and out at the limbus was another smaller facet which was difficult to see owing to its smooth surface and the absence of an opacity. Neither of these facets stained, and were doubtless the result of one of the previous attacks. The pupil was round and responded promptly to light. The tension was normal. Vision $=\frac{6}{1\,6}+$.

Two drops of scopolamin were instilled in the right eye and produced a moderate dilatation of the iris without revealing any evidences of synechiæ. Dionin, hot fomentations, and boric acid solution were ordered for the right eye, while in the left only the cleansing solution was used. Directions were given as to the diet and bowels. Two days later the patient was more comfortable, the injection had subsided, especially above, and the corneal haze above the infiltrate was less pronounced. After cocainization the corneal ulcer was touched with carbolic acid and scopolamin prescribed. V. of O.D. $=\frac{6}{2\,0}$?. At the end of a week the eye showed marked improvement; the injection was less, the infiltrate in the lower quadrant was thinner, especially at the limbus; the saturated dots in the upper portion of the cornea had disappeared, no staining could be produced by fluorescein, and the patient was free from pain. V. of O.D. $=\frac{6}{1\,5}$?.

Dr. William Pepper, to whom the patient had been referred for medical examination, reported that the blood, heart, and lungs were normal, and that there were no evidences of any definite gastro-intestinal lesions. After eliciting the following history, the patient was referred to Dr. M. B. Hartzell, who subsequently reported that she had a mild acne rosacea. The patient stated that a skin eruption first appeared about three years ago, when she

was pregnant with the next to the youngest child, and while this was present her eyes became inflamed, but this only persisted for two weeks and mostly affected the right eye. This was repeated during her last pregnancy, but was then more severe. The eruption varied in intensity and was always much in evidence when she was pregnant, and when not pregnant, any remaining evidences of the facial condition were always aggravated during the menstrual epoch.

Up to this time the eye had steadily improved and the quadrant infiltrate had thinned to such an extent that the iris could be seen at the periphery; the injection had almost disappeared, except below, where the vessels in the infiltrate could be traced across the limbus to the lower fornix. On June 8th the corneal condition became much worse, despite the fact that the eruption on the face seemed to be better than when first seen. Photophobia and lachrymation were again marked, and scattered through the cornea for several millimetres above the lower quadrant infiltrate were numerous small superficial punctate grayish infiltrates, and a number of these showed a central pinpoint elevation above the corneal surface. With fluorescein they took a faintly green color.

The punctate condition began to melt away after twenty-four hours, and six days later the eye was slightly better than prior to the relapse and practically free from injection, except below. V. of O.D. = $\frac{4}{10}$??. On June 18th the right eye again became slightly injected, and there could be noted a fresh band of infiltration to the outer side of the lower quadrant defect, associated with a few punctate deposits. The acne at this time was also slightly more pronounced. Within the next two weeks these new infiltrates gradually disappeared. Variations in sensation of the two corneæ could not be definitely determined.

In May a stye on the lower lid had been incised, and later on another had formed at the outer canthus of the upper lid, which was also incised. About July 1st a few more tiny lesions resembling phlyctenules had formed along the lower limbus of the left eye, while the inner, lower, and especially the outer portions of the ocular conjunctiva showed numerous dilated and blocked lymphatic vessels. In the right eye the lower quadrant infiltrate was beginning to lose its outline. The improvement continued, the most marked portions of the infiltrate being at the apices or spurs. By July 16th this was scarcely visible three feet from the patient, but upon closer examination a depression could be noted at the apex of each spur. The left eye, which had also improved, again showed a moderate lymph-

angiectasis. The further course of the condition was uneventful, and on August 10th all ocular treatment was stopped aside from yellow oxide ointment. The patient reported on November 1st, at which time the eyes were quiet. V. of O.D. = $\frac{6}{6}-$, of O.S. = $\frac{6}{6}-$.

On January 27, 1910, the patient reported for refraction and stated that she had not used treatment of any kind since late in December. The face was slightly marked by a mild acne, and as there was a slight injection of the bulbar conjunctiva without any fresh corneal lesions, the patient was advised to again use the face lotion.

February 9th the eyes were quiet. Vision: O.D. -1.75 s.⊃ $+2.25$ c. axis $90° = \frac{5}{7.5}$, 3 letters on $\frac{6}{6}$ O.S. $+1.25$ c. axis $105° = \frac{6}{6}+$.

Dr. Edward H. Goodman reported the following: "The urine was collected for twenty-four hours on two successive days, chloroform being used as a preservative. The usual qualitative tests were made, but apart from a slight excess of indican in one specimen, nothing pathologic was found. In addition, quantitative estimations were made of the total nitrogen, urea, uric acid, ammonia, volatile fatty acids, chlorids, phosphates, and sulphates, ethereal and preformed. The result of these examinations was negative, the percentage of the various nitrogenous compounds to the total nitrogen being about normal. There was a slight reduction in the amount of chlorids, which might be explained by the salt poor diet the patient was taking while under observation. Microscopic examination of the urine was negative."

The literature dealing with the ocular phenomena in connection with acne rosacea is meagre, and especially so in the larger reference works on ophthalmology. I failed to find any mention of rosacea keratitis in Graefe-Saemisch, Lagrange and Valude, Norris and Oliver, Knies[1] and Schmidt-Rimpler.[2] Vossius[3] states that a superficial vascular keratitis, usually confined to the lower portions of the cornea, may develop in connection with acne rosacea. Haab[4] also states that nodules may form about the corneal margin which resemble eczema pustules, and the eruption is frequently

[1] *The Eye in General Diseases*, edited by Noyes.

[2] *Die Erkrankungen des Auges in Zusammenhang mit anderen Krankheiten*, Nothnagel's System.

[3] *Lehrbuch der Augenheilkunde*, pp. 306, 383.

[4] *External Diseases of the Eye*, edited by De Schweinitz.

seen on the cornea of patients the subjects of aggravated acne rosacea. He describes the infiltrate as gray in color, slightly raised above the surrounding level, and states that it leads to a more pronounced opacity than the eczema pustule, and that he has known it to produce almost complete opacity of both corneæ in the course of years.

In 1864, Arlt[1] briefly referred to a possible involvement of the cornea and conjunctiva in connection with acne rosacea, but his description represented a milder type than most of the cases reported in recent years, although he pointed out its obstinacy and chronicity and recognized the importance of a successful treatment of the skin affection. He believed the localized and superficial loss of substance in the cornea to be due to the breaking down of a corneal nodule, although he stated that he had never actually observed it. Horner and later his associate, Knies[2] called attention to the analogy existing between acne vulgaris and hordeolum, and acne rosacea and chalazion, and the latter observer believed that we were justified in regarding chalazion, despite the various possible objections, as the affection of the lids which corresponds to acne rosacea. This view, however, has never been generally accepted. In this connection it may be interesting to recall that in the personal observation cited above no chalazion was present, but a hordeolum formed at two different periods.

Capauner[3] stated that he had never seen a chalazion associated with an ocular rosacea, and further, the other recent ocular cases reported show that it has been generally absent. Hyde and Montgomery[4] state that acne rosacea may be associated with an acne vulgaris.

In 1903, Capauner[5] reported a series of five cases of rosacea keratitis, all but one occurring in elderly women, the exception being a woman aged 43. He called attention to its relationship with disturbances of the sexual organs, and stated that he had never seen a case in a male. All of these cases had extensive bilateral superficial vascularized infiltrates that

[1] *Klin. Monatsbl. f. Augenheilk.*, 1864, p. 329.
[2] *The Eye in General Diseases*, edited by Noyes, 1895.
[3] *Zeitschr. f. Augenheilk.*, vol. xi., 1903, p. 126.
[4] Textbook of *Diseases of the Skin.*
[5] *Loc. cit.*

tended to push towards the central portions of the cornea, and exhibited marked obstinacy to treatment. Some of his cases also developed conjunctival efflorescences.

Kuntz[1] in 1905 cited two case-histories in which the patients, both females, had similar corneal and conjunctival lesions, and in addition, one patient developed a frank peripheral ulcer and had an adherent leucoma of the cornea the result of an inflammation of the eye one year before she came under observation. Both cases were characterized by obstinacy and tendency to recurrence. Wicherkiewicz,[2] in the same year, published the history of a forty-three-year-old woman whose left eye showed a superficial vascular keratitis, with a central corneal ulcer, and the right eye an adherent leucoma with pannus. For one year prior to her coming under observation there had been some menstrual disturbance.

In 1906, Schirmer[3] reported an additional observation and cited the two case-histories previously reported by Kuntz. The patient was a male, aged 52, whose left eye was blind as the result of an injury and secondary glaucoma, while in the right eye there existed a superficial vascularized infiltrate of the cornea, associated with acne rosacea. In the subsequent course of the disease a small corneal ulcer developed.

In the same year Blancke[4] reported in detail four more cases and gave brief reference to three others, one of the last group having had a kerato-iritis. All of these cases were in elderly people except one male aged 40 years. In this case there was also a decided vascularized infiltration of the cornea, with the formation of an ulcer with an undermined, elevated, and yellowish border. The other cases cited in detail all revealed similar infiltrates, and in one of these bilateral ulceration of the cornea and bilateral iritis occurred, associated with an hypopyon in the left eye, and in another case an episcleritis was a late manifestation.

Sydney Stephenson[5] in the same year also cited the case-history of a woman, aged 40, who had not menstruated for

[1] *Postep. Okulist.*, Aug., 1905.
[2] Inaug. Dissertation, 1905, reported from Schirmer's Clinic.
[3] *Zeitschr. f. Augenheilk.*, vol. xv., 1906, p. 501.
[4] Inaug. Diss., 1906, reported from Vossius's Clinic.
[5] *Trans. Ophth. Soc. U. K.*, vol. xxvi., 1906, p. 150.

two years. This case, while persistent, was not as severe as those cited above, but showed several corneal deposits and lesions about the limbus resembling phlyctenules.

In 1907, Goldsmith[1] referred to another case observed in a male, aged 40, who developed characteristic lesions in the lower portion of each cornea, and finally, in the following year, Cruise[2] observed similar bilateral lesions in a male, aged 47, who had had repeated attacks of rosacea for twenty years.

It is quite probable that ocular involvement in cases of acne rosacea is observed more frequently in women than in men, but this is to be expected, as, according to Crocker, the same conditions hold true as regarding acne rosacea in the proportion of five to one. The same relationship exists as to age, for, according to the above authority, the bulk of the cases of acne rosacea begin after the twenty-fifth year. All of the cases cited above were 40 years of age or older, at the time of observation. One of the main causes of acne rosacea in both sexes is gastro-intestinal disturbances, while in women uterine disturbances are a frequent cause. Duhring[3] states that Hebra first pointed out the tendency of this condition to develop in early womanhood, or about the menopause and in the former period its manifestations were not apt to be severe. These facts are of interest in connection with my own case in which the patient was only 29 years old, and the eyes first became involved three years before she came under personal observation. The mild acne had existed about three years, although she stated that her nose had been subject to attacks of redness for ten or twelve years. At first I regarded the underlying condition as gastro-intestinal, but subsequent examination by Dr. Pepper, fortified by the metabolic studies of Dr. Goodman, eliminated anything more serious than a probable temporary indigestion the result of indiscretions in diet.

Stelwagon[4] calls attention to intranasal pressure, or disease, giving rise to vascular and lymphatic obstruction as a probable

[1] *The Ophthalmoscope*, vol. v., 1907, p. 20.
[2] *Trans. Ophth. Soc. U. K.*, vol. xxvii., 1908, p. 45.
[3] Textbook of *Diseases of the Skin*.
[4] *Ibid.*

cause, and in this connection Lloyd[1] refers to polypi, enlarged anterior ends of the middle turbinates, and hypertrophic rhinitis as having been present in a number of cases he has examined. As ocular phenomena are apt to develop or become aggravated with an increase in the intensity of the acne, it may be mentioned that in most of the cases cited above ocular symptoms developed in the spring or fall. Other prominent factors in the production of acne rosacea are alcohol, exposure to the weather, and cosmetics.

In my own patient the lids of the right eye presented a severe blepharitis and were somewhat nodular, as was also true in one of Capauner's cases. In the left eye the disease ran a mild course, probably best described as a conjunctivitis, and corresponded to the type mentioned by Arlt, and presented one old facet without opacity, to which he refers. The multiple small efflorescences along the lower limbus in this eye were of a grayish color, although in some of the cases similar lesions of reddish hue have been described. One of the most interesting features in this eye was the marked lymphangiectasis that developed, producing the most marked type of this condition that I have ever observed. In neither eye were there any efflorescences confined to the bulbar conjunctiva alone, or on the sclera, as occurred in one of the cases cited by Capauner and in another by Kuntz. Quite in contrast to the left eye was the intensity of the lesions present in the right eye. Here the dense superficial vascular grayish-white infiltrate containing several yellowish dots, with its somewhat uneven and at places slightly elevated surface, corresponded to the description of most of the other cases cited above, not only as to the conditions just mentioned, but also in its location, for the lower half of the cornea is the portion almost invariably affected, although in one of Capauner's cases the vascularized infiltrate occurred in the upper and inner portion of the cornea.

To the best of my knowledge, no microscopic examination has as yet been made of this ocular condition, and no description of it could be found in Parsons.[2] In my own case, Dr. Charles M. Hosmer determined the presence of the staphy-

[1] *Brit. Med. Journ.*, 1905, vol. i., p. 74.

[2] *Pathology of the Eye.*

lococcus pyogenes aureus, not only in the conjunctival secretions, but also in the pus evacuated from the stye. The corneal infiltrates in the cases referred to by Kuntz and Schirmer were regarded as subepithelial and the latter observer believed the new-vessel formation and the probable hyperplasia of the subepithelial tissue favored the conception of its being regarded an acne rosacea corneæ. Capauner. who also regarded the corneal and conjunctival lesions as analogous to the rosacea lesions, referred to the infiltrate as involving the superficial layers of the stroma. While he also stated that he had never observed a frank ulcer formation, this condition, as referred to above, has been noted by other observers, and in some cases in a rather malignant type. It may also be recalled that two patients, at the time they came under observation, had an adherent leucoma of the cornea.

At least three of the cases cited above developed an iritis, and in one case a hypopyon developed which subsequently absorbed. It is interesting to note that in one of the patients whose case-history was cited by Kuntz a nodule was removed from the cornea and inserted into the anterior chamber of a rabbit's eye with negative results.

Owing to the marked tendency of the infiltrate in the more serious or corneal type of this affection to push from the periphery towards the pupillary area, and to become aggravated or recur with subsequent outbreaks of the facial acne, vision in many of these cases has been seriously impaired, in a number of instances being reduced to counting fingers when they first came under observation. The first two cases cited by Capauner terminated in total opacification of the cornea and almost complete blindness, while the reporter believed a similar result would have occurred in the third case had not death interrupted the process. The other case-histories in which the final vision was stated show more favorable results, the visual acuteness varying from $\frac{1}{4}$ to $\frac{3}{4}$ of normal vision. The affection that is most apt to be confounded with this condition is phlyctenular disease, which it markedly resembles, but here the age of the patient and, still more important, the existence of acne rosacea, not necessarily severe, should determine the diagnosis.

In the treatment of the conjunctival type Arlt believed in the efficiency of the local use of powdered calomel, which is also suggested by Fuchs and de Schweinitz. This drug proved of service to Capauner in one instance, while in another case aristol ointment was successful in checking each relapse. He believed, however, that the destruction of the infiltrate by the galvano-cautery was the surest means of checking the process. The cautery was also resorted to in one of Blancke's cases and in Goldsmith's case, and in addition, the latter observer divided the vessels leading to the infiltrate. In one of the cases cited by Kuntz and Schirmer, subconjunctival salt injections and puncture of the anterior chamber were resorted to, and in a subsequent recurrence the subepithelial lesion was divided and curetted. Needless to say, heat and atropin have been generally employed. In my own case, in addition to the treatment already mentioned, zinc applications were made to the lids, and after the development of the superficial infiltrates in the upper portion of the cornea, holocain was employed with the utmost satisfaction.

De Schweinitz,[1] and later Verhoeff,[2] have referred to the value of this drug in superficial corneal lesions. In summing up the conditions present in the above cases, I was much impressed by several factors: first, the various theories concerning the actual pathology of acne rosacea, and also the fact that its lesions are confined to the distribution of the fifth nerve, but especially the second or maxillary branch; further, the similarity of some of the lesions to a number of the conditions described by Verhoeff, and it will be recalled that in my own case there developed what was clinically a superficial punctate keratitis to which he refers. I was then much gratified to find, after carefully referring to Verhoeff's admirable contribution, that he states that the holocain treatment had proved most efficient in cases of keratitis from acne rosacea.[3] In a personal communication from him on this subject, he states that he has employed this treatment for the past three years and cannot recall a single case in which the treatment was not successful, and that under the

[1] *Ophthalmic Record*, 1902.
[2] *Trans. Ophthalmic Section, A. M. A.*, 1909.
[3] *Trans. of the Ophthalmic Section, A. M. A.*, 1909, p. 353.

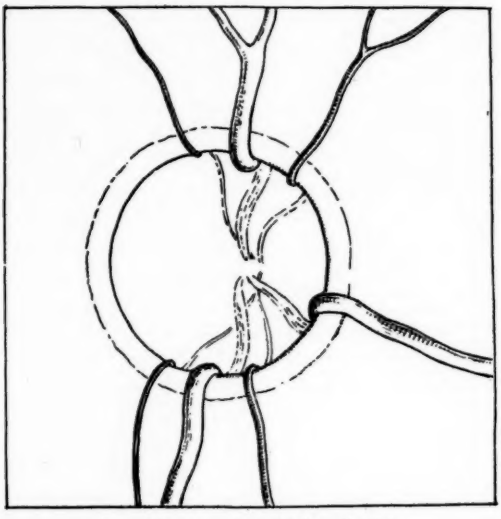
instillation of holocain the small peripheral ulcer will heal without becoming vascularized to any extent.

In the above cited cases various preparations, such as sulphur, ichthyol, lenigallol, kephalol, and Unna's zinc paste have been employed for the facial lesions. Acting on the advice of Dr. Hartzell, my own patient was given sodium hyposulphite internally, with the local application of a solution of zinc sulphate and potassa sulphurata, and I may add with very good results.

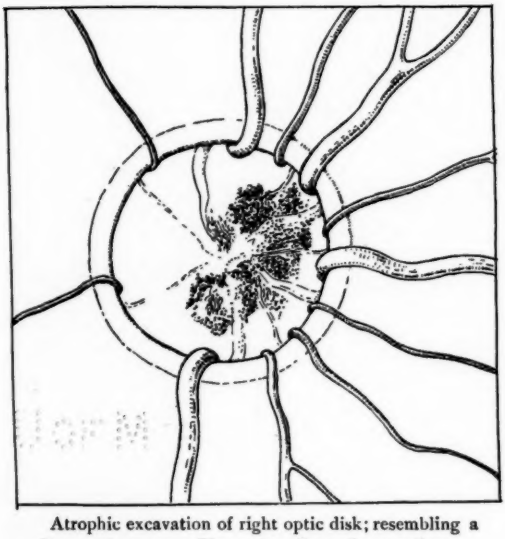
Doubtless many cases of keratitis associated with acne rosacea have been observed and never placed on record, owing to the lesion remaining localized and sooner or later responding to treatment, or, finally, because the ocular affection has not been recognized as the so-called *keratitis ex acne rosacea*. If we recall, however, that acne rosacea, according to Stelwagon, furnishes three per cent. of all cases of skin diseases, I believe the majority of us will agree with Stephenson, who states that in his experience rosacea of the cornea and conjunctiva is anything but a common exanthematous affection of the eye.

Marl

TO ILLUSTRATE DR. GRUENING'S ARTICLE ON "METHYL ALCOHOL AMBLYOPIA. CLINICAL RECORDS AND HISTORICAL STUDY."



Atrophic excavation of left optic disk.



Atrophic excavation of right optic disk; resembling a glaucomatous eye. Pigment on floor of excavation.

METHYL ALCOHOL AMBLYOPIA. CLINICAL RECORDS AND HISTORICAL STUDY.

By Dr. E. GRUENING, New York.

(With two figures on Text-Plate XI.)

THE use of methyl alcohol in the preparation of spirituous liquors is at the present time so widespread that the best efforts of the Physician, the Sanitarian, and the Economist will be needed for its suppression.

The fact that methyl alcohol in small doses may cause incurable changes in the nervous tissue of the eye, makes it a grave source of danger not only to the habitual drinker, but also to the honest laboring man who only takes a "wee drop" at times. Since under certain conditions methyl alcohol poison is absorbed by inhalation or cutaneously, workmen in whose trades methyl polishes and varnishes are used are subject to attack. Symptoms of poisoning due to massage with wood alcohol have also been reported.

During the past year I have observed ten cases of methyl alcohol amblyopia in my clinic and in private practice. Two of these show notable divergences from the recognized type and are therefore worth reporting.

The first case was that of a young man who became totally blind on partaking of a large quantity of wine purchased from a peddler. He was treated for 14 days in Bellevue Hospital, and was then referred to my clinic at the N. Y. Eye and Ear Infirmary.

The examination showed a picture of double atrophy of the optic nerve. There was maximum dilatation of both pupils without reaction to light. The optic disks white, without any capillary injection whatever. Retinal arteries and veins narrower than normal. Sight = 0.

The patient was treated for two months with iodide of potassium, strychnine, pilocarpine, and Bier's method

(neckband). The sight improved R $\frac{1}{10}$, L $\frac{1}{100}$. In both optic disks excavations absolutely resembling those of glaucoma had formed under my observation, without apparent tension. In the right optic nerve there was a hemorrhage on the floor of the excavated disk, pigmented traces of which are still visible. Dr. Percy Fridenberg was kind enough to make the accompanying characteristic sketch of this condition.

In a paper read before the Ophthalmological Society (Heidelberg, 1907), Elschnig maintained that atrophic excavations of the disk, resembling those of glaucoma, never occur, basing his opinion on pathological investigations. In the discussion that followed, Schmidt-Rimpler doubted the correctness of this contention. The case cited above causes us to agree with Schmidt-Rimpler. In this unmistakable case of atrophy of the optic nerve there was an excavation of the optic disk, and bending of the temporal and nasal vessels, without increase of tension, and without any symptom of glaucoma. The floor-level of the optic disk was six D. deeper than that of the edge.

CASE 2.—H. K., 44 years old, drank several glasses of whiskey that tasted so well that he had a bottle filled at the saloon. On reaching home in the evening he half emptied the bottle and awoke blind in the morning. Eight days later he came to my clinic, and his condition was reported as follows:

Maximum dilatation of both pupils, which were immovable. Media clear. The optic nerves white, with veiled edges, and sheaths of connective tissue surrounding the veins and arteries. No perception of light.

The wife of the patient brought me samples of three different drinks of which her husband had partaken for some months past. The chemical analysis was made by Dr. Bookman in the pathological laboratory of Mt. Sinai Hospital, and showed:

In the first sample, 24% of methyl alcohol.
" " second " 32% " " "
" " third " 43% " " "

Under treatment (iodide of potassium and diaphoresis) his condition showed marked improvement, the pupils grew smaller, and again reacted to light. On Dec. 26th the vision was $\frac{1}{10}$ in each eye. I had an opportunity of re-examining this patient in June, 1909, when I found that the sight had retrograded R to $\frac{1}{100}$ L to $\frac{1}{10}$. The optic

disks were indistinctly outlined and the adventitious coat of the vessels had thickened. We probably had to deal in this case with a chronic methyl alcohol poisoning with acute exacerbation. The connective-tissue formation seen in this case in the optic nerve and surrounding the vessels is of rare occurrence in acute methyl alcohol amblyopia.

Two additional amblyopias caused by inhalation recovered completely. The six remaining cases showed the usual picture of atrophy of the optic nerve. One patient became totally blind, the others could count fingers at a distance of several feet.

The literature of methyl alcohol amblyopia offers so many points of interest that a short survey of it might not be out of place. As late as 1898 Georg Baer wrote: "Cases of methyl alcohol poisoning in human beings are unknown."[1] The experiments on animals which had been made up to that time, to determine the relative toxicity of various forms of alcohol, proved methyl alcohol to be the least poisonous.[2]

Rabuteau[3] made the statement that the toxicity of an alcohol rises proportionately with the height of its boiling-point and the amount of carbon it contains. According to this theory, methyl alcohol, CH_2 OH, which boils at 65°, ought to be the least toxic.

When it became possible to produce pure odorless methyl alcohol commercially, its use became general in the United States, to replace the more expensive and highly taxed ethyl alcohol in the preparation of spirituous liquors. The results of the animal experiments seemed to justify such a course. It was soon recognized, however, that these conclusions were drawn from false premises, and that the experiments on animals had no direct application to human beings. The experiments had determined the lethal dose for animals, but had failed to take into account the ante-mortem degeneration of certain organs, chiefly the eye.

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[1] Georg Baer: *Beitrag zur Kenntniss der akuten Vergiftungen mit verschiedenen Alkoholen.* Berlin, 1898. (Inaugural Dissertation.)

[2] Joffroy and Serveaux: "Nouveau Procédé de Mensuration de la Toxicité des Liquides par la Méthode des Injections Intra-veneuses. Applications à la Determination de la Toxicité des Alcools." *Archives de Médecine Experimentale et d'Anatomie Pathologique,* 1895.

[3] Cited by Baer.

Very soon cases of partial or total blindness, and even of death, which could only be ascribed to methyl alcohol poisoning, were reported on every hand. Additional experiments on animals, to investigate the pathology of the optic disturbance, were undertaken by Ward Holden,[1] Friedenwald,[2] Birch-Hirschfeld, and others. Birch-Hirschfeld[3] experimented on dogs and apes and demonstrated decided changes both in the optic nerve and in the ganglion-cells of the retina. The ape showed greater susceptibility to methyl alcohol poison than the dog.

Clinical records of cases increased in number. In 1904 Wood and Buller[4] reported a great number of cases of loss of sight, and of death, collected from medical literature.

Essences, tinctures, liquors, wines, all contain wood alcohol. Even the stringent Pure Food Law has proved ineffectual, though it provides that the manufacture, sale, or transportation of adulterated food-stuffs or liquors shall be punishable with $500 fine, one year's imprisonment, or both, at the discretion of the court.[5]

The cases that came under my observation were reported to the Board of Health. The health-officer received the report sympathetically. An official looked up the cases in their homes, and endeavored to trace the sources of the poison. There the matter rested.[6]

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[1] Ward Holden: "The Pathology of the Amblyopia Following Profuse Hemorrhage and of that Following the Ingestion of Methyl Alcohol, with Remarks on the Pathogenesis of Optic-Nerve Atrophy in General." ARCHIVES OF OPHTHALMOLOGY, vol. xxviii., 1899, p. 637.

[2] Harry Friedenwald: *Johns Hopkins Hospital Bulletin*, 1902.

[3] "Weiterer Beitrag zur Pathogenese der Alkoholamblyopie." *V. Graefe's Archiv für Ophthalmologie*, liv. Band, 1902.

[4] *Journal of the American Medical Association*, 1904. "Poisoning by Wood Alcohol." "Cases of Death and Blindness from Columbian Spirits and other Methylated Preparations." Frank Buller, M.D., Montreal. Casey A. Wood, M.D., Chicago.

[5] Pure Food Law of 1906, No. 384. An act for preventing the manufacture, sale, or transportation of adulterated, or misbranded, or poisonous, or deleterious, foods, drugs, medicines, and liquors, and for regulating traffic therein, and for other purposes.

[6] Since writing the above, I learn from Dr. Ward A. Holden that Dr. Lederle, the present Health Commissioner, has proceeded against sellers of wood alcohol, and has secured several convictions.

BACTERIOLOGICAL EXAMINATION OF THE CONJUNCTIVAL SAC PREVIOUS TO CATARACT EXTRACTION.

By Dr. HARRY S. GRADLE,

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THE recent discovery of Elschnig and Ulbrich,[1] of the importance of streptococci in the conjunctival sac before cataract extraction, has made necessary the bacteriological examination of every conjunctiva before operation. In the discussion of Elschnig's paper,[2] Axenfeld said that this could be easier done by the examination of smears from the conjunctiva than by cultural methods. In order to test this statement, I undertook the examination of a series of conjunctival sacs which were at the same time examined by the cultural method previous to cataract extraction. The eyes were then bandaged for a varying number of hours, after which the contents were again examined. In making the examinations, a smear was made from the lower conjunctival sac by sweeping a platinum loop clear across the fornix up to the caruncle, including if possible any filaments of mucus or pus which were present. These smears were then fixed and stained with both methylene blue and Gram. The cultures were made by the serum-bouillon method described by Elschnig and Ulbrich.

The results obtained were so varying that a word of explanation is necessary. If the fluid obtained for examination consisted only of tears, there was no definite point such as

[1] Elschnig and Ulbrich: *V. Graefe's Arch. f. Ophth.*, Bd. lxxii., H. 3.
[2] Elschnig: Int. Med. Congress, Budapest, Aug., 1909.

a leucocyte or an epithelial cell to fix by, and it was therefore almost impossible at times to differentiate between micro-organisms of the coccus type and atmospheric dust which had become impregnated with the stain. Again precipitations from the stain were apt to cause great confusion.

In tabulating these results, I shall speak only of streptococci which in these examinations are of greatest importance on account of their being the chief cause of post-operative infection, classing all other micro-organisms under the head of "other bacteria." Also it is only streptococci that grow well under the cultural conditions of small amount of culture medium and but twenty-four hours' growth. Fifty eyes were examined and streptococci were found by cultural methods in 29 cases. In 16 of these 29 cases streptococci were found in smears, while in 2 of the 21 culturally sterile cases streptococci were found in smears where they failed to show by cultural methods. In 9 of the 50 cases, other bacteria were found in culture while in only 4 cases were these bacteria found in smears. Thus these results agree (bacteriologically positive or negative) in 27 cases (see table), giving a percentage of 54.

In 32 cases a bandage was applied from 2 to 12 hours, but in only 3 cases were bacteria found after bandage where previous search had not revealed them.

No.	First Smear	Hrs. of Bandage	Second Smear	Culture	Results
1	Diplococcus	6	Diplococcus	Streptococcus	+
2	Diplococcus	—	—	0	—
3	0	—	—	Streptococcus	—
4	0	—	—	Streptococcus	—
5	0	6	Xerosis	Xerosis	+
6	0	8	0	Streptococcus	0
7	0	8	0	Streptococcus	0
8	0	5	0	0	+
9	0	12	0	Streptococcus	—
10	0	12	0	Streptococcus	—
11	0	12	0	0	+
12	0	12	0	0	+
13	0	12	0	0	+
14	0	12	Diplococcus	Streptococcus	+
15	0	12	Diplococcus	Streptococcus	+
16	0	4	0	0	+
17	0	6	0	0	+
18	0	—	—	0	+

No.	First Smear	Hrs. of Bandage	Second Smear	Culture	Results
19	0	12	0	Staphylococcus	—
20	0	12	0	Staphylococcus	—
21	0	—	—	0	+
22	—	6	0	0	+
23	0	7	0	0	+
24	Diplococcus	7	Diplococcus	Streptococcus	+
25	Diplococcus	7	Diplococcus	Streptococcus	+
26	0	7	0	Xerosis	—
27	0	7	0	Xerosis	—
28	—	7	0	Streptococcus	—
29	—	7	0	Xerosis	—
30	—	12	Diplococcus	Streptococcus	+
31	—	12	0	Streptococcus	—
32	—	12	Diplococcus	Streptococcus	+
33	—	12	Diplococcus	Streptococcus	+
34	—	12	0	Streptococcus	—
35	—	12	Diplococcus	Streptococcus	+
36	—	12	Diplococcus	Streptococcus	+
37	—	12	Diplococcus	Streptococcus	+
38	—	12	Diplococcus	Streptococcus	+
39	—	12	0	Streptococcus	—
40	—	12	0	Streptococcus	—
41	—	12	Diplococcus	Streptococcus	+
42	—	12	Diplococcus	Staphylococcus	+
43	—	12	Diplococcus	Streptococcus	+
44	—	12	0	Streptococcus	—
45	0	3	Diplococcus	Xerosis	—
46	0	3	0	Xerosis	—
47	0	3	0	Staphylococcus	—
48	0	10	0	Streptococcus	—
49	Diplococcus	3	Diplococcus	Streptococcus	+
50	Diplococcus	3	Diplococcus	Streptococcus	+

I am unable to give statistics showing the amount of time necessary to examine each smear thoroughly, nor can I give an idea of the ease with which some foreign matter may be mistaken for a micro-organism. But for the thorough examination of each smear fully forty minutes to an hour will be required by the trained bacteriologist, and even he can make mistakes. Again, in the majority of cases it is impossible for even an expert to say whether two micrococci lying side by side are merely harmless staphylococci or whether they are virulent and dangerous pneumococci.

In order to place the bacteriological examination of the conjunctival sac at the disposal of the practising physician, who may not have the laboratory of a clinic at his disposal, Professor Elschnig has devised the following. Instead of

freshly mixing the normal horse serum and bouillon[1] each time a culture is required (this mixture is necessary for the rapid and accurate growth of the pneumococci in question), ½ *c. c.* of normal sterile horse serum is evaporated to dryness by a vacuum process in a plugged test-tube, and the necessary quantity of bouillon (½–2 *c. c.*) is hermetically sealed in a small glass vial. When a culture is required, the top of the vial is broken off and its contents poured into the test-tube, which can be heated to 60° C. for an hour if doubts exist as to its sterility. After shaking a few minutes, the serum dissolves and forms a slightly opalescent fluid. Experiments carried out at this clinic show that this culture media is just as accurate as that made by mixing the two ingredients each time before use.

Therefore I do not think that the examination of the conjunctival sac for streptococci by the smear method is trustworthy or sufficient, nor does the application of a bandage for any length of time simplify this method. In conclusion, I wish to extend to Professor Elschnig my heartiest thanks for the inspiration and for his kind assistance and co-operation.

[1] This serum and bouillon are thus prepared by Paul Altmann, Louisen Strasse, 47, Berlin, N. W.

HYALINE DEGENERATION OF THE CORNEA.

By Dr. J. RUBERT, Kieff.

(With four illustrations on Plates A–B.)

Abridged Translation from the German Edition, February, 1910, by Dr. Matthias Lancketon Foster.

HYALINE degeneration is not rare in the eye. It is often normally present in age and is frequently met with in various pathological conditions. In the cornea it manifests itself in various ways. According to Fuchs the arcus senilis is due to a finely granular hyaline substance; hyaline masses are found associated with lime salts in band-like corneal opacities, and von Recklinghausen considers the "drusen" of Descemet's membrane one of the types of hyaline degeneration. Hemispherical deposits of a homogeneous substance on the outer surface of Bowman's membrane have also been observed. The papillary corneal opacities described by Groenouw are caused by deposits of hyalin in a comparatively intact corneal tissue, while a similar condition was found by Nuel in keratitis punctata superficialis. The yellow spots to be seen in leucomata, staphylomata, and irido-corneal cicatrices are likewise caused for the most part by the formation of hyalin. Microscopically it appears to be a strongly refractive homogeneous substance met with sometimes in the form of minute granules, sometimes in that of little drops, or in irregularly defined masses, situated sometimes in the epithelium, sometimes in the superficial layers of the cornea, or of cicatricial tissue.

In 1887 Berlin described the case of a girl 17 years old, otherwise healthy, who had suffered three years before from a slight, bilateral granular conjunctivitis which later got well

leaving few scars. A year later there appeared on the left cornea without known cause a white, somewhat yellowish opacity of the cornea which started from the upper margin and was separated from the healthy corneal tissue by a fairly sharp horizontal margin. During the next two years the infiltrate gradually extended, always with a fairly sharp horizontal margin, until it covered rather more than the upper half of the cornea. The color remained the same, but the surface seemed raised a little above that of the healthy cornea. As all treatment proved futile the superficial mass was removed. Soon afterward the patient disappeared so the final result is not known. The microscopical examination showed that a considerable quantity of adenoid tissue had penetrated the substance of the cornea and that a well marked hyaline degeneration was present which involved both the constituents of the penetrating tissue and the fibrils of the cornea. The most striking peculiarity consisted of a massive deposit of homogeneous bright bodies, varying in form and size, in the adenoid tissue itself and particularly in the walls of the numerous newly formed vessels. Berlin called his case one of "sclerosing corneal infiltration" but found that it differed both clinically and pathologically from the ordinary keratitis scleroticans. He assumed that traces of the apparently healed granular conjunctivitis had remained latent somewhere and then took their way from the bulbar conjunctiva into the cornea producing an immigration of adenoid tissue which then became the seat of a hyaline degeneration.

In 1894 Gallenga described a similar case met with in an anæmic, lymphatic girl 19 years old who had suffered from trachoma since she was four years old. When ten years old the first sign of a corneal infiltrate was noticed in the upper margin of the right cornea. The infiltrate gradually extended. Exacerbations of the trachoma frequently occurred associated with signs of irritation of the eye. At such times the infiltrate had a bright red, or a dark red tone, but at other times it was yellowish white. After the infiltrate had gradually spread on the cornea for six years it began to proliferate above the limbus. The final condition given by Gallenga was that almost the entire right cornea was covered by a yellowish white formation, while a slight superficial infiltra-

tion had appeared in the upper-inner part of the limbus of the left. The further course of the case up to 1905 is given by Luccarelli. The condition became worse each year in the winter and spring. In January, 1905, both lids of the left eye were swollen. On eversion of the lids the conjunctiva presented numerous proliferations of varying size; the smaller were yellowish white and resembled trachoma granules. The bulbar conjunctiva was very hyperæmic, the inflammatory new formation had overgrown the limbus and presented a picture similar to that of vernal catarrh. The color of the new growth was reddish yellow. It was thick and had extended far over the cornea. The vision of each eye was reduced to perception of movements of the hand. Microscopic examinations were made by both Gallenga, and Luccarelli and their findings were similar. Both devoted particular attention to the changes in the epithelium, which often appeared thickened and sending branching cones into the deeper parts. In the peripheral parts of the cones the cell nuclei were frequently in indirect segmentation; in the centre the cells were flattened and often formed pearls. In the subepithelial tissue were epithelial rings with lymphoid elements in their centres. Sometimes the epithelial cells showed the formation of vacuoles and in places the cells themselves were destroyed. Bowman's membrane was everywhere absent. Beneath the epithelium was vascular adenoid tissue containing lymphoid elements, polynucleated leucocytes, and granulation cells. Some of the abundant vessels were unchanged, others had thickened walls and contracted lumina, others were completely obliterated by peri- and endovasculitis. Many vessels had homogeneous walls, very many were changed into completely homogeneous glassy masses in the centres of which traces of endothelium could be detected here and there. Berlin pictures similar changes in the vessels in his case.

Luccarelli thought the disease a rare form of vernal catarrh; Gallenga thought it more nearly related to trachoma.

CASE I.—J. T., 22 years old, unmarried, a peasant of little Russia, came to me in March, 1907, to have a spot removed from his right eye. He had had trouble with the eye for a long time, but had never had it treated. For

the past two years the vision had been worse than formerly. About 8 months before he had accidentally noticed a yellowish spot on the upper margin of his right cornea, which had spread without causing any special symptoms of irritation. Otherwise he felt perfectly well and nothing abnormal could be found in his general condition.

The changes in the cornea are depicted accurately in Fig. 1. Almost the entire upper half of the right cornea was covered by a newly formed tissue which extended about a millimetre over the limbus. Its color was yellowish white, its surface slightly nodular, but lustrous, and slightly elevated above the level of the rest of the cornea. Its consistence was cartilaginous, its sensibility to touch reduced. It was sharply differentiated from the rest of the cornea below by a more or less horizontal line. The uninvolved cornea in the upper half on the nasal side was covered by pannus. The vessels of the bulbar conjunctiva in the parts adjoining the new growth were injected and in places seemed to pass over to the latter and give it a somewhat reddish tone. No other changes in the right eye were to be seen. The fundus, so far as it could be examined, seemed to be normal. The vision was fingers at $3\frac{1}{2}$ metres, not improved by glasses. T. n. The left eye was unaffected, the vision $\frac{20}{20}$. The conjunctiva of both lids of each eye was reddened and thickened. It had a velvety appearance with brawny infiltrates in places. The beginning of cicatricial formation could be seen in the right upper lid. Secretion was slight.

Several pieces were taken from different parts of the surface of the new growth for microscopical examination which gave the following result: The corneal epithelium was everywhere preserved and appeared to be unevenly thickened. The basal cells for the most part preserved their cylindrical form, but in places appeared to be flattened. Their nuclei stained well, the protoplasm was slightly swollen. The cells of the upper layers likewise appeared somewhat enlarged and became gradually flatter toward the surface, their nuclei stained more weakly, and in places they had become horny. Sometimes the horny cells were arranged in layers like those of an onion and formed pearls within which the formation of keratohyalin was frequently taking place. In the deeper layers of the epithelium the intercellular system of spaces was often visible, but the latter appeared most distinctly between the prickle and basal cells, sometimes also there was a formation of vacuoles in the cells (œdema). In some places the epithelium sent conical offshoots into the underlying tissue, yet the cones always appeared to be sharply differentiated

from this tissue, and no reaction could be detected in the neighboring connective tissue. Polynucleated leucocytes were often to be found between the epithelial cells, and in places there were collections of them beneath the epithelial covering. Normal corneal elements were absent in the subepithelial tissue, which was very vascular and consisted of a network with cells embedded. The vessels were changed almost everywhere, except that in the immediate neighborhood of the epithelium there were single capillaries whose walls appeared normal. The vessels were of larger and smaller calibre. The larger lay mainly in the deeper layers and were more frequently met with in cross-section. The smaller were present in great numbers everywhere and permeated the preparation in all possible directions. The walls of the vessels were greatly thickened and transformed into a homogeneous structureless substance. The smaller vessels showed the most marked changes. Their walls consisted usually of two layers; the outer which was much the thicker, was homogeneous, and could not be distinguished in appearance from the changed trabeculæ of the reticulum, with which it was fused in many places; the inner was formed of a series of partly sclerosed endothelia. Sometimes the latter appeared detached from the wall and free in the lumen. In places there was a proliferation of nuclei which had caused an obliteration of the vessel. In many vessels the endothelium was completely wanting and their walls consisted of a homogeneous layer simply. More rarely among the smaller vessels some were met with in which the outer layer was formed of several layers of thickened homogeneous fibres which were also in immediate connection with the reticulum. In places these fibres joined together, sometimes they were fused into a homogeneous mass in which the endothelium was lost. The lumen of these vessels was small, not infrequently excentric, sometimes entirely absent, thus giving rise sometimes to homogeneous cords, sometimes to glassy flakes according to the direction of the section.

The changes in the larger vessels were similar. Their walls were enormously thickened and composed for the most part of two layers, the outer formed of thickened, homogeneous fibres lying concentrically. The peripheral fibres often passed over into the neighboring trabeculæ of the reticulum and appeared thicker than those occupying a more central position. A fusing of the fibres into homogeneous masses was less frequent. Here and there nuclei were present between the fibres. The inner layer consisted of endothelium, part of which appeared succulent,

part sclerotic. Very often there were signs of proliferation, but this had rarely resulted in complete obliteration of the lumen. In a considerable number of the large vessels a loose layer of delicate fibrils with nuclei lying concentrically could be seen between the outer layer and the endothelium. In these vessels the peripheral layer of homogeneous fibres was less developed. Sometimes a vessel was met with having a large lumen and walls comparatively thin, though composed of hyalinized fibres. In the lumen lined with endothelial cells was a finely granular mass with polynucleated leucocytes. Erythrocytes were absent. I do not consider these to have been lymphatic vessels. The blood-vessels contained no blood.

The reticulum was everywhere distinct and had the appearance of a dense, unevenly thickened homogeneous network, broken in places (Fig. 3). The changes became gradually greater from the surface toward the deeper parts of the tissue. The swelling and broadening of the homogeneous trabeculæ increased, the meshes became smaller, and the number of the cells found in them became less; often the latter were atrophic and some meshes were reduced to fine, empty spaces. Glassy homogeneous surfaces were formed by the fusion of the degenerated trabeculæ with each other as well as with the obsolete, degenerated vessels. Only in the neighborhood of the epithelium did the reticulum present in places the appearance of a network of delicate fibres, very like the framework of adenoid tissue. In some places where the reticulum was adjacent to a degenerated vessel it was thickened for a short distance, rarely homogenous.

The superficial layers were rich in cells, but the number of these progressively decreased in the deeper layers. Some contained a small, well-stained nucleus surrounded by a very little area of protoplasm (lymphoid cells), but these were in the minority. The majority contained a distinct layer of finely granular protoplasm with an intensively stained nucleus which was frequently excentric. The form and size of these cells (granulation cells) varied; some contained mitoses, some had two nuclei. Other cells had large bodies and contained large, faintly stained, frequently vesicle-like nuclei (endothelial cells). More rarely giant cells were observed. Their nuclei had usually a marginal position. The cells lay close to the degenerated vessel walls and hyaline portions of tissue.

In places beneath the epithelium appeared a young, fibrous connective-tissue. For a considerable distance the epithelium appeared to be separated from the subjacent tissue by a scanty, homogeneous lustrous layer which

followed a wavy course corresponding to the thickenings of the epithelium and was interrupted in many places. I consider this lamella to have been the remains of Bowman's membrane. At one place only did it retain more or less of its former appearance, yet here it was displaced from the epithelium by a layer of young granulation tissue. In most places this membrane had gone and left no trace.

In the deeper parts there were lymphoid and granulation cells lying in the meshes of the thickened, homogeneous reticulum. These cells were for the most part atrophic, their contours washed away, their nuclei small and poorly stained, or altogether lost. Nowhere could the most careful examination detect a transformation of the cell protoplasm into a homogeneous substance. The atrophy of the cells was of a purely passive character. Further, I was never able to see hyaline granules or globules appear in the cells. The non-participation of the cells in the formation of the homogeneous product was seen most plainly in those cases in which the homogeneous substance and the cell protoplasm were stained differently; for this purpose Ziehl–Neelsen's method is the best, in which the cells are stained blue and the degenerated reticulum rose or red.

With regard to the action of staining materials I may say here that hæmatoxylin leaves the homogeneous substance unstained, eosin gives it a rose-red stain, thionin a bright green, orange g. a beautiful gold yellow which makes a very instructive picture in combination with hæmatoxylin. Van Gieson's method stains the degenerated reticulum and vessel walls sometimes rose, sometimes yellow; where the changes are the more marked, yellow only. Ziehl-Neelsen's method usually stains the homogeneous places rose-red, rarely leaves them unstained; the unchanged reticulum, as well as the non-hyalinized fibres of the vessel walls are always stained blue. Lugol's solution causes a uniform straw-colored stain of the entire preparation which is not materially changed by the addition of sulphuric acid. Methyl blue gives only an intense blue stain, methyl violet a violet.

CASE 2.—A. B., 18 years old, an unmarried woman of little Russia, came to me in January, 1904, with the same request as the first patient. Her eyes had never been well since she could remember. Nine years before, the vision of both eyes began to fail. In the spring of 1903 she first noticed a whitish yellow spot on the upper margin of the right cornea, which gradually extended without causing irritation. Toward Christmas it had covered a part of

the pupil; since then no increase had been observed. In other respects she was in good health. Her mother had had trachoma for many years; her father and her brothers and sisters had healthy eyes.

The changes on her right cornea are depicted in Fig. 2 and differ little from those described in Case 1. More than the entire upper half of the cornea was involved in the new growth, which did not extend beyond the limbus. The color was the same, the surface slightly rough but lustrous, and it was slightly elevated above the level of the rest of the cornea, from which it was sharply differentiated by a more or less horizontal line. The remaining cornea appeared to be covered everywhere with pannus. The upper half of the bulbar conjunctiva was slightly reddened and near the limbus it enclosed the corneal neoplasm in the form of a rose-red margin 1*mm* broad. The left cornea was covered with pannus. Neither fundus could be seen clearly, but no gross changes were detected. The vision of each eye was fingers at 4½ metres, not improved by glasses. T. n. The palpebral conjunctiva was in the stage of cicatricial trachoma. In November, 1905, the condition had not changed except that the vision had fallen to fingers at 3 metres.

The microscopical examination showed that the epithelial layer was irregularly thickened, but nowhere sending cones into the deeper tissues. The cells appeared slightly swollen, their nuclei stained well. In places the formation of vacuoli in the cells could be noticed (œdema). The basal cells had retained their cylindric form for the most part. Sometimes single scattered polynucleated leucocytes lay between the epithelial cells. Nothing could be seen of a Bowman's membrane. The subepithelial tissue had a cicatricial character. Its fibres appeared thickened and sclerotic, their course wavy, but more or less parallel to the surface. While the fibres commonly lay close together they were separated in many places, giving the tissue a reticulated appearance. In such places and in the corresponding epithelium signs of œdema were generally noticeable. In places the epithelium appeared to be lifted up from the subjacent tissue. Cells lay embedded between the fibres in great numbers. Some were spindle-shaped, had well-stained nuclei, and appeared to be distributed regularly in the tissue. Others were variable in form and contained well-stained nuclei surrounded by a small quantity of finely granular protoplasm (granulation cells). These cells were scattered very irregularly and were particularly numerous in the neighborhood of tissue spaces, vessels, and the corneal lamellæ about to be mentioned. No

lymphoid or giant cells were observed, but here and there were polynucleated leucocytes.

In some places there were lymph spaces lined with sclerosed endothelium. The vessels were not many, mostly small and lying in the deeper parts, but their walls appeared changed throughout, markedly thickened, generally composed of two layers. The peripheral layer consisted of a series of thickened homogeneous fibres lying concentrically fused in some places into homogeneous masses. Sometimes nuclei were present between the fibres. The inner layer was formed of endothelium which appeared partially sclerotic, usually involved in proliferation which, in many cases, had resulted in complete obliteration of the lumen. In some vessels the entire wall consisted of a glassy mass, the endothelium was wanting, and the lumen was much contracted. The changes in the larger vessels were similar to those described above. Their walls consisted of several layers of homogeneous masses, their lumens were contracted, but still contained endothelium which showed signs of proliferation.

In the deeper parts were peculiar formations which had the appearance of homogeneous lamellæ (Fig. 4). They had a certain similarity to the lamellæ of the cornea, of which I take them to have been a modification. These lamellæ were thicker than those of the normal cornea and appeared quite homogeneous everywhere. They were commonly found in patches, several lying close together with their direction parallel to the surface of the cornea. Between the homogeneous lamellæ lay sclerosing connective-tissue which contained a large number of granulation cells and degenerated vessels. Very often the lamellæ fused into homogeneous bands which in places united to form shapeless masses in which could be seen here and there fine spaces, corresponding to the interlamellar spaces. Sometimes the lamellæ were to be seen in oblique or transverse section. More rarely they were met with in the midst of cicatricial tissue. Sometimes a lamella suddenly changed its course to another direction, occasionally bending at right angles to the surface. In some places the lamellæ were broken down, thus forming places consisting chiefly of fine homogeneous granules and globules between which hyalinized capillaries and the remains of incompletely destroyed lamellæ were to be met with. Usually these places followed signs of reaction on the part of the surrounding connective-tissue and the appearance of a connective-tissue capsule about them was not uncommon.

It may be said here that the homogeneous substance stained well with the basic as well as with the acid coloring

materials. Very effective pictures were obtained by Van Gieson's method, which gave the homogeneous substance the most various color tones between gold yellow, orange, and dark red.

CASE 3.—E. B., 20 years old, a woman of little Russia, appeared in the clinic at Kieff, Sept. 20, 1907. Diagnosis: Right eye: Degeneration of the cornea. Trichiasis of upper and lower lids. Dacryocystoblennorrhœa. Left eye: Trichiasis of upper and lower lids. Follicular trachoma of both eyes with pannus. Vision, O.D. 0.1; O.S., $\frac{8}{200}$.

The degenerated place involved almost the entire upper half of the cornea, was of a dirty yellow color, and was raised somewhat above the level of the rest of the cornea. The beginning of the degeneration dated back about 10 years. It appeared at first as a little yellow spot at the upper margin of the cornea whence it had gradually spread downward. Sept. 22, operation on left eye for trichiasis. Oct. 11, extirpation of the right lachrymal sac. Nov. 8, removal of the degenerated part of the cornea. The superficial layer was carefully dissected up without severing the connection with the limbus, the altered tissue excised, and the wound covered again by the flap that had been dissected up. Healing by primary union. In Nov., 1908, there was nothing to be seen of the former corneal degeneration and there was no ectasia of the cornea. The vision was 0.2, while in the left eye the pannus had increased and the vision had fallen to $\frac{3}{200}$.

The tissue obtained was divided into two lateral halves by a vertical incision and the microscopic sections made parallel to this. It was fixed, embedded, and stained as in the other cases and in addition Weigert's method of staining for fibrin was employed.

The preparation consisted for the most part of thickened homogeneous lamellæ running parallel to the surface of the cornea. The lamellæ appeared from $1\frac{1}{2}$ to 2 times as thick as those of the normal cornea and in some places were confluent. Frequently they were to be met with in oblique and transverse section, more rarely they had an abnormal direction as in Case 2. In places they were broken down into homogeneous globules and granules. No inflammatory reaction was observed in the neighboring tissue. One or more rows of unchanged corneal lamellæ with rod-like nuclei commonly lay between the homogeneous bands. The deep portions of the preparation showed principally intact corneal tissue consisting of regularly arranged lamellæ with rod-shaped nuclei. Yet in some places the lamellæ appeared loosened and split,

the nuclei unchanged, even their number not increased. Sometimes capillaries containing blood were to be seen in the corneal tissue, the walls of which were formed of a row of sclerosed endothelia. There were no signs of reaction in their neighborhood.

The homogeneous substance stained as well with the basic as with the acid colors. Van Gieson's method gave particularly instructive pictures in which the homogeneous substance was stained sometimes gold yellow, sometimes orange, while the rest of the tissue assumed a bright red stain. In sections stained with Weigert's method the homogeneous lamellæ and their broken-down products behaved the same as the rest of the tissue. Lugol's solution with sulphuric acid and solutions of gentian and methyl violet produced a uniform stain of the preparation.

When we compare these cases with those quoted from literature we see that the clinical picture is the same. In all there is a peculiar new formation of tissue in the cornea which appears to be a grayish yellow or yellowish white deposit raised a little above the level of the rest of the cornea, from which it is differentiated more or less sharply. The surface is slightly rough with here and there little vessels coming from vessels in the bulbar conjunctiva, the latter slightly injected in the neighboring parts. At first the process is always localized at the upper margin of the cornea whence it gradually spreads downward, frequently with a fairly sharp horizontal demarcation from the transparent corneal tissue. In the more severe cases, such as Gallenga–Luccarelli's, it may cover almost the entire cornea. Whether this is the rule or not I cannot say. The course of the disease seems to vary, but on the whole to be extremely slow. The dimensions of the new growth were about the same in Berlin's case and in my second and third, yet in Berlin's the disease had lasted 2 years, in my second case 1 year, and in my third 10 years. Fig. 2 shows the appearance of the eye of my second patient in January, 1904, and after nearly two years, in November, 1905, I could not detect a difference. Its development seems to take place without special signs of irritation, except for a slight injection of the adjacent bulbar conjunctiva. I am inclined to ascribe the frequently recurring irritation in Gallenga–Luccarelli's case to exacerbation of the conjunctival trouble.

In Case 1 the new growth extended slightly beyond the limbus. The same was true to a greater degree in the case observed by Gallenga and Luccarelli. According to both authors the infiltrate was localized on the cornea at first and afterward proliferated over the limbus where it formed a circular thickening about the latter.

The palpebral conjunctiva was trachomatous in all five patients; in two the trachoma was in the cicatricial stage, three exhibited the typical picture of chronic trachoma with commencing cicatrization in places. I do not agree with Luccarelli's opinion that the granules were not trachomatous; the rest of the clinical data and the entire course of the disease indicate that it was trachoma.

The patients were all healthy and strong with the exception of Gallenga–Luccarelli's. They were between 10 and 21 years of age, four female and one male. In four only one eye was affected, in three of these the right; in one the disease was bilateral, the right eye first affected.

In all trachoma of the conjunctiva preceded the appearance of the corneal trouble. In my patients the commencement of the trachoma could not be ascertained, the other writers placed it from 1 to 15 years before the corneal affection. In my first and second patients the vision had been reduced by pannus 2 and 9 years before the corneal disease, my third patient was not questioned in regard to this.

In all of my cases there was a superficial, somewhat vascularized opacity of the uninvolved portion of the cornea. In the first case this opacity was localized near the new growth, in the other two it covered the entire lower half of the cornea. In these two the cornea of the other eye was also covered by a quite similar opacity which I do not doubt was pannus. The clinical picture always gave me the impression that the new growth had developed from this pannus. The yellow color suggested hyalin to me at the first inspection so that I recorded the cases under the diagnosis of "hyaline degeneration in corneal pannus." Neither Berlin, Gallenga, nor Luccarelli mention any relation of the new growth to the pannus. They leave the rest of the cornea unconsidered or find it normal. Fuchs says in his text-book that a rare metamorphosis of pannus is into a dense, white or yellowish,

non-vascular tissue, similar to a dense scar after a deep ulcer. I have been able to find nothing else concerning this matter in literature.

The deeper parts of the eye appear in all cases to be unchanged so far as an examination was practicable. The corneal change naturally reduces the vision and the prognosis is bad in every case. No improvement was ever obtained by medicaments, and I believe that none should be expected. Operative intervention alone is indicated.

Histologically my cases differ more or less from each other. In common they all show a special tissue change manifested in the appearance of a homogeneous substance, sometimes in the form of single structures, sometimes in the form of bands. In two cases this substance stained with the basic as well as with the acid dyes. In Case 1 it was not stained by hæmatoxylin and in places also by the Ziehl–Neelsen method which commonly gave the substance a rose-red stain. The reactions for amyloid were always negative, I do not hesitate to designate this substance as hyalin. while I strongly differentiate it from keratohyalin and colloid. These designations are frequently applied erroneously, as when in the pathology of the cornea the same pathological products are termed sometimes hyalin, sometimes colloid. A sharp differentiation is not possible physically nor chemically, but is possible histogenetically as laid down by Prof. Wyssokowitsch. He considers hyaline degeneration as a change of the endothelium and its derivatives as well as of the tissue genetically connected with it, keratohyalin and colloid as changes of the epithelium, the former of the flat epithelium, the latter of the cylindrical. In my cases the hyaline degenerated tissue was genetically related to the endothelium or its derivates.

The histological condition of my first case alone was similar to that of Gallenga and Luccarelli and that of Berlin. In the cornea was a new, vascular tissue which had an adenoid character. In Berlin's there was a reticulated connective-tissue in the meshes of which lymphoid cells were embedded. In Gallenga and Luccarelli's the cells were chiefly lymphoid with some connective-tissue cells. In my case the lymphoid cells were in the minority, the majority were young granula-

tion cells containing one, rarely two, intensively stained nuclei with a distinct areola of protoplasm. Sometimes cell division was present in them. More rarely endothelial cells were observed. Giant cells were scarce. I do not believe that the latter have any genetic connection with hyaline degeneration and consider them only as giving an impression of the reaction on the part of the living tissue to the hyaline masses. The distinctly marked reticulum with cells in its meshes gave the tissue its adenoid character. In my case the hyaline degeneration involved the reticulated ground substance and the vessel walls, the cells remained passive and gradually atrophied, partly from pressure, partly from disturbed nutrition. This observation is in contradiction to those of writers who ascribe an active part to the lymphoid cells in the production of hyalin. Kamocki in a case of hyaline degeneration of the conjunctiva says he saw the first signs of degeneration in the lymphoid cells, but I am inclined to think that they were endothelial (epithelioid) cells rather than lymphoid as the author himself says that in their dimensions and distinct cell bodies they resembled the so-called epitheloid, and the illustrations confirm this view. In that case Kamocki's observation would be confirmatory of the theory given above of the genesis of hyalin.

The changes in the reticulum and vessel walls do not differ from those in Berlin's, Gallenga's, and Luccarelli's cases, and are very like those met with in hyaline degeneration of the conjunctiva, which is not surprising as embryology teaches that the anterior segment of the cornea is a continuation of the conjunctiva.

The changes in the vessels are shown in general in a marked thickening of the walls and a gradual transformation of the latter into a hyaline, structureless substance. The lumen is usually contracted, but often contains endothelial cells, or their remains. Sometimes they are obliterated by endovasculitis. In places the vessel is transformed into a quite homogeneous hyaline mass.

The trabeculæ of the reticulum are frequently interrupted, appear hyaline, swollen, and unevenly broadened (Fig. 3). In many places it is directly connected with the homogeneous masses of the vessel walls. By the fusing of the obsolete

degenerated vessels with the adjoining hyaline tissues large homogeneous flakes are sometimes formed.

Berlin found the corneal epithelium normal and no special changes on the part of the epithelium have been noticed in cases of hyaline degeneration of the conjunctiva. In Gallenga–Luccarelli's case the condition was not normal. I also found in places thickenings and cone-like deepenings of the epithelium, but I cannot consider these changes, either in my own or in Gallenga–Luccarelli's case, as typical of vernal catarrh. Analogous changes in the epithelium are frequently observed in other pathological processes in the cornea, particularly in pannus. On the other hand the proliferation of the epithelium cannot be considered a constant symptom in vernal catarrh. It is better to consider the epithelial changes as concomitant phenomena of the process taking place in the subepithelial tissue.

In my case the upper layers of the epithelium were cornified in places and formed homogeneous masses which are to be classed as keratohyalin. This is not mentioned by the others.

Berlin mentions hyaline degeneration of the corneal lamellæ, which was not observed by Gallenga–Luccarelli or in my first case, possibly because the material for examination was not thick enough. In my second and third cases this alteration of the true corneal tissue was quite marked. In both of these cases nothing of an adenoid tissue was to be seen, there were neither lymphoid cells nor a reticulum. In Case 2 a broad layer of sclerosed connective-tissue lay immediately beneath the more or less changed corneal epithelium, was rich in cells, and contained vessels that had undergone hyaline degeneration. In the deeper parts were remains of true corneal tissue, the lamellæ of which had been transformed throughout into thick, hyaline, swollen, and homogeneous bands (Fig. 4). I did not find any breaking down of the lamellæ into bundles and fibrils, such as Berlin describes, and I do not believe it can be found by the ordinary methods of investigation. In places the hyaline bands fused and formed homogeneous flakes, broken down in places into a finely granular detritus. About these hyaline masses and between the degenerated lamellæ often lay granulation cells, which I take to be signs of reaction on the part of the surrounding

tissue. No giant cells were met with. It may be remarked here that Berlin found near the limbus instead of adenoid tissue a very wavy cellular connective-tissue, partially with hyaline deposits.

In my last case the preparation consisted principally of degenerated corneal lamellæ and the picture was similar to that in Case 2. The epithelium and the immediately subjacent tissue was not removed at the operation, so I can tell nothing concerning its nature. In the deep parts of the preparation remains of lamellæ were met with, part normal, part split up, with no hyaline degeneration in the latter.

I believe that the vessel walls should be looked upon as the starting point of the hyaline formation in my cases. I have never seen normal vessels bordering on hyaline degenerated tissue, while I have seen the reverse repeatedly. Thus in my first case the cellular layer just beneath the epithelium had a normal reticulum, while the vessels were hyaline almost throughout. Only in their immediate neighborhood was the reticulum sometimes thickened and rarely hyaline. The condition met with in hyaline degeneration of the conjunctiva does not seem to contradict this theory. In Guth's case the degeneration was confined to the vessels and the surrounding tissue showed scarcely any changes.

The formation of hyalin seems to precede certain changes in the organ involved. In the vessels this change is shown in a marked thickening of the walls, and the most peripheral part of the wall seems to be the first involved. I have never met with hyaline masses in the central parts alone, while on the contrary I have seen very often the degeneration confined exclusively to the peripheral segment of the vessel wall. Almost coincidently with the degeneration of the vessels the adjacent reticulum becomes thickened, swollen, and homogeneous, and changes seem to precede the degeneration of the true corneal substance, shown by breaking and splitting up of the lamellæ, as seen in my last case.

Before closing I feel it necessary to speak of the relation of the hyaline degeneration to trachoma, or pannus, from the histological standpoint. The clinical picture indicates a very close relation between the two processes. The number of microscopic studies of pannus is very small in comparison

with the many clinical observations. The most thorough work was by Raehlmann, published in 1887. Later writings deal more with the relations of the pannus tissue to the anterior basal membrane than to the tissue itself. Most authors picture the latter as a granulation tissue which sooner or later becomes cicatricial. Raehlmann pointed out that the histological picture of pannus is not uniform, but varies. He says: "In the early stages pannus has the histological peculiarities of adenoid tissue. It consists of a reticulated framework of fibrous substance containing numerous lymph bodies. In the adenoid tissue beneath the epithelium a peculiar cicatricial tissue is formed at an early period, which seems at first to come from a thickening of the adenoid framework. The fibres of the cicatricial tissue increase later in thickness and breadth and show a marked tendency to sclerosis. Within the cicatricial tissue itself round cells are very scarce, but there are occasional spindle-shaped, drawn-out nuclei, cross-sections of flat cells, and, sparsely scattered, cells with endothelial surfaces and short processes. After the scar has finally developed adenoid tissue and small cell infiltration is no longer found." Raehlmann believed the cicatricial tissue arose from the adenoid, but such a theory is no longer compatible with the present views concerning general pathology. I believe that pannus tissue should be considered not as exclusively adenoid, but as a tissue of several origins in which both lymphoid elements and connective tissue take part. In the cicatrization the former is lost while the latter proliferates. If we compare the pathological condition in our cases with that described by Raehlmann there can be no doubt as to the identity of the newly formed tissue in the cornea with a corneal pannus. In my first patient, as well as in Berlin's and Gallenga–Luccarelli's, the degeneration of the involved tissue took place in a comparatively young pannus, while in my second case the pannus was in the cicatricial stage. In hyaline degeneration of the conjunctiva it is the adenoid layer which is chiefly involved, and most writers agree as to the dependence of the hyaline degeneration upon trachoma. In the cornea there is normally no adenoid tissue, but such is formed by the trachomatous process and this becomes degenerated. If a similar substratum should be able to develop

in the cornea from other causes the possibility of a similar formation of hyalin could not theoretically be excluded. In the observations thus far made trachoma has always been present, as has been shown both clinically and histologically.

ON THE ETIOLOGY OF BILATERAL CONGENITAL CORNEAL OPACITY, WITH A REPORT OF THREE CASES.

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OUR knowledge of the affection indicated in the title has been advanced in recent years by a series of articles from Leber's clinic, in Heidelberg, which by careful clinical examination and unexceptionable histologic study prove the inflammatory nature of a large number of congenital corneal opacities. Still, considering the rarity of closely observed cases, we have not reached a point in the discussion of this subject at which new observations may seem superfluous.

From this point of view the report of the following three cases may be of interest:

Case 1.—H. K., 4½ days old, was first seen on April 27, 1905. The parents had noticed a gray scum on the eyes on the second day. The lids had not been sticky, and there had been no discharge. Three other children were born dead after forced delivery by version and extraction. The children had reached term and were well developed. The mother suffered with "the whites" before marriage, and this became more marked later. Otherwise she has always been well.

The child is big and strong, and particularly well nourished. The cranium shows marked asymmetry due to flattening of the left half of the vault. The skin of the body is free from eruption. Marked photophobia, right and left. No morbid changes in the ocular or palpebral conjunctiva.

O. S. There is decided injection of the bulbar conjunctiva and of the episcleral vessels. The cornea is almost completely covered by a dense grayish white opacity. Upward and outward there is a small area of normal tissue. The entire surface is smooth and shining. At the centre of the opacity there is a small transparent prominence, of about the size of a pin-head, resembling a vesicle. From the lower inner margin numerous superficial branching vessels run far into the cornea. The diameter of the cornea is estimated at 10*mm*. The anterior chamber is shallow. The iris, as far as it is visible, is very dark and indistinct. Below, it is evidently adherent to the corneal cicatrix. The tension cannot be accurately determined. O. D. free from injection. The cornea is of normal curvature, uniformly smooth and lustrous. Below and somewhat outward there is an approximately circular opacity about 3–4*mm* in diameter, which partly covers the pupil and is situated in the middle and deeper layers of the stroma. This area is most dense at the centre, and gradually fades off into the clear cornea. The anterior chamber is of normal depth. The iris is dark, like the left, but more distinctly marked. The pupil is small and round. After atropin, there is regular but not full dilatation. The lens is perfectly transparent. A red reflex is obtained from the fundus but the restlessness of the patient prevents any observation of details.

Two weeks later the condition was unchanged, except that there was a fistulous opening in the corneal scar of the left eye in place of the vesicular protrusion described above.

September 7, 1905. O. S. The globe appears enlarged in all visible dimensions. The corneal cicatrix is markedly ectatic, protruding conically beyond the lid-fissure. There is a noticeable increase in the transparent area of the cornea. The sclero-corneal margin has been obliterated. The sclera is dirty white, and much darker than that of the other eye. The anterior chamber is almost completely abolished. The iris is firmly adherent and drawn out toward the cicatrix. T. +1. O. D. The corneal opacity has become less dense. At the centre there is a small white spot.

Diagnosis: Leucoma adherens and secondary glaucoma, O. S. Macula corneæ, O. D.

Case 2.—J. W., aged 3 weeks. May 8, 1905. Dense leucomata of the cornea were seen on both eyes immediately after birth and no change has since taken place. There has been no ocular inflammation or secretion at any time. The patient is the first child of healthy parents after 3½ years of wedded life. There are no indications or history of syphilis or tuberculosis.

The child is healthy and well nourished. The skin is clear. There is no photophobia. The lids are well developed, sinking in deeply when the eyes are closed. The lid fissure is of normal extent.

O. D. about ⅔ smaller than normal, in all dimensions. In place of the cornea a flat porcelain-white scar with a smooth, shining surface is seen, about 3*mm* in diameter. The scar tissue continues into the sclera without a sharp boundary, except at the upper margin where there is a narrow rim of clear cornea. A few very fine vessels are seen in the scar. O. S. also much diminished in size, but less so than the right. Two thirds of the cornea are occupied by an almost pure white opacity, the upper third alone being clear and transparent. The surface is smooth. There is no vascularization. Corneal diameter, about 4*mm*. Curvature scarcely perceptible. Anterior chamber very shallow. The iris can be seen only as a dark reflex under the clear zone. The pupil is completely hidden.

September 7, 1905. The right eye appears unchanged. O. S.: The cornea shows a good curvature. Its diameter is now 6*mm*. The transparent zone is much broader than before, so that a small part of the pupil can be seen above. Below, it is more than half hidden by a dense white opacity. There is a crescentic opacity about ½*mm* wide between the upper corneal margin and the clear area. The anterior chamber has a depth proportional to the size of the globe. The color and markings of the iris are unchanged. There is no evident pupillary change after instillation of atropin. It is impossible to determine whether there are any anterior or posterior synechiæ. In the neighborhood of the corneal scar between the limbus and the ora serrata, the sclera shows a number of sharply defined slaty spots, without any change of level.

Diagnosis: Phthisis bulbi, O. D. Leucoma corneæ, O. S. Microphthalmus, O. U.

CASE 3.—H. G., 14 days old. September 2, 1905.

The child has not opened the eyes of its own accord since it was born. On the eighth day the mother says she noticed a gray cloud on both eyes. There has been no secretion or sign of inflammation. Both parents are healthy and have been married for 1¼ years. This is the first child, and there have been no miscarriages.

The patient is a remarkably well nourished and healthy-looking child which weighed nine pounds just after birth. No eruption on any part of the body. Lids somewhat velvety and hyperæmic. A small amount of mucoid secretion, which was found to be sterile, appeared in the conjunctival sac.

O. D. decidedly increased in size in all visible dimensions. Marked conjunctival and ciliary injection, with dilatation and tortuosity of the anterior ciliary veins. The surface of the cornea is dull and stippled, the diameter about 13*mm*. Its greater part is occupied by a bluish-gray opacity with a dense network of superficial vessels. There is a clear zone at the margin above, about 4*mm* wide. The limbus is spread out, the sclero-corneal margin indistinct. As far as it is visible the sclera is tense, and of a dirty white color. The iris is dark grayish-green, indistinct, and almost adherent to the cornea throughout its entire extent. The pupil cannot be seen. Tension +1. O. S. apparently free from irritation. The entire cornea is smooth and shining, of normal curvature and not enlarged. At the periphery it is perfectly transparent. At the centre, directly over the pupil, there is an intensely white opacity including the entire thickness of the stroma. It is approximately triangular in form, with the base downward, and just the size of the pupil.

The anterior chamber is markedly shallowed by a bulging forward of the entire surface of the iris. The latter is grayish green and clearly marked. The pupil is very small, about 1½*mm*, dilating evenly but not to the maximum after atropin. The lens shows an opacity at the anterior pole, corresponding exactly in position, configuration, and extent to the corneal scar just mentioned. The lenticular opacity is not uniformly dense, however, the margin alone appearing intensely white, while the central area gives a delicate gray reflex. The rest of the lens is perfectly transparent.

Fundus normal, as far as it can be seen.

Diagnosis: Leucoma corneæ (adherens?) and glaucoma (hydrophthalmus), O. D. Macula corneæ centralis and anterior polar cataract, O. S.

September 23, 1905. By this time a marked clearing of the corneal opacity of the right eye had taken place from the margin, but there was no change in the glaucomatous signs. In the left eye, the opacity was unaltered, but the anterior chamber had become deeper, the markings of the iris more distinct, and the pupil larger. The grayish green discoloration of the iris had given way to a fine blue-gray.

The pathogenesis of the corneal changes just described is indicated very clearly, in my opinion, by the clinical picture.

The presence of vascularized corneal scars in two cases,

and the complete loss of the cornea in the third, show beyond a doubt that the eyes were affected during intra-uterine life by severe inflammatory processes. In regard to the etiology of these inflammations, hereditary syphilis does not seem probable in view of the negative family history and the excellent general condition of all three children. The most probable factor seems to me to be that of a bacterial infection. According to current theories there are two ways in which such an infection could take place, the pus-germs reaching the cornea through the amniotic fluid, or, by metastasis, through the general circulation. In the first instance we speak of ectogenous, in the second, of endogenous infection. The latter is practically always complicated with infection of the anterior uveal tract, and may be considered as essentially a secondary process. According to Leber, ectogenous infection is the cause of those cases of congenital, stationary, corneal opacity "in which dense, cicatricial opacity of the cornea, the presence of an anterior synechia . . . or the formation of staphyloma, point to a previous ulcerative process." The presence of a congenital purulent conjunctivitis would indicate "that the keratitis was not a primary process, but was caused by the conjunctival affection, probably." With this adverb, Leber admits that the cases cited by him in support of his view are not quite convincing. It cannot be denied that a conjunctivitis which was not noticed until the second or fourth day may have developed during or after birth, although the conjunctival changes noted in one case (Landrau) are not usually seen at an early stage. This also applies to a case reported by Saemisch, of conjunctivitis developing in utero with simultaneous purulent destruction of the cornea. The finding of pneumococci in the conjunctival secretion of a 7-weeks-old child (Hippel) does not throw much light on the pathogenesis of the microphthalmus or anophthalmus present in the case, in spite of the midwife's statement that there was a purulent discharge from both eyes immediately after birth. In the exceptional cases in which conjunctivitis was noted immediately after birth, no bacteriologic examination was made of the secretion, so that the presence of an infectious process, which alone could cause severe damage to the eye, was not proven.

For the diagnosis of congenital conjunctivitis reliable data of the length and course of the birth are essential, for in protracted delivery with early rupture of the membranes, infection may well take place, intra partum, and present the picture of a severe conjunctivitis. In determining the course of the delivery obstetricians attach little importance to the statements of the mother in regard to the time at which the bag of waters bursts. In a case recently observed, the membranes ruptured three days before delivery. The child was born with a severe blennorrhœa, the secretion containing gonococci, and the cornea being already opaque. There was no doubt here that infection had taken place intra partum after the membranes had ruptured. This point has not received sufficient attention in earlier publications on the subject. In Armaignac's careful review of the literature, there is not a single case which is free from objections on this score. In a number of the reported cases, besides, vaginal examinations had been made by several students. Armaignac is quite right when he says that the observation reported by him is merely the first which points with some probability toward blennorrhœic infection taking place within the intact membranes. In one case, it is stated, there were pains for only 1½ hours and the 8-months child was expelled in less than an hour after the artificial rupture of the membranes. Within one hour after delivery bilateral purulent ophthalmia and vulvo-vaginitis were found. There is no mention of a bacteriological examination. The data as to the course of the delivery were unfortunately based only on the statements of a midwife, so that they are not above suspicion. In Nieden's case we have the attending physician's statement that the birth took place with unruptured membranes. As there was a history of blennorrhœa coming on in the days immediately following delivery in four elder children, particular attention was paid to "preventing the face from coming in contact with the membranes," and the face and eyes were carefully disinfected. In spite of these precautions, a conjunctivitis developed 24 hours after birth, which Nieden says presented the clinical picture of a mild blennorrhœa, although no gonococci were found in the discharge. I cannot agree that the infection of the child's eyes neces-

sarily took place within the unruptured membranes, for in spite of the procedures instituted, an infection during the cleansing of the eyes cannot be excluded, nor can we deny the possibility of a conjunctivitis developing within the space of time mentioned. Groenouw, I find, interprets this case exactly as I have done.

In Strzeminski's case of congenital blennorrhœa of intrauterine origin, there is a similar hiatus, as we are not informed of the authority for the rather carefully detailed account of the course of birth. The patient was the second child of a mother affected with gonorrhœa, whose first child showed signs of purulent ophthalmia 4 days after birth. The delivery of the second child, it is stated, took 13 hours; the membranes not rupturing until the os had been completely dilated, and birth taking place a few minutes later. Within 4 hours, there was a typical blennorrhœa of both eyes and a slight opacity of the left cornea. The author claims that there was no possibility of a high rupture of the membranes in his case, because, "as he had been informed," the bag of waters presented normally, and the amniotic fluid escaped in about the usual time, but this statement is not conclusive, as obstetricians agree that, in spite of a high rupture, there may be no loss of the waters. It seems to me that some importance attaches to Kroll's hint that possibly an excessive contamination of the amniotic fluid with fœtal excrement may under certain circumstances cause severe irritation of the conjunctiva, although we could hardly hold a conjunctival irritation of this sort responsible for marked damage to the cornea or the globe. Similarly, we cannot consider putrefaction of the amniotic fluid, alone, as a cause of purulent destruction of the cornea, as it is well known that this form of decomposition is due exclusively to anaërobic *i. e.*, non-pyogenic bacteria. Menge and Kroenig have, however, demonstrated the possibility of a symbiosis of anaërobic germs with any other species of aërobic pus-germs in amniotic fluid.

The possibility of both forms of infection, endogenous and ectogenous, is proven, at least theoretically, by the fact that pus-germs can enter the fœtal circulation through the intact placenta, as well as the amniotic fluid through the intact

membranes. In the first instance the question arises why the germs should have selected the eyes of the fœtus as the only point of attack. At the present time we must have recourse to such indefinite predisposing factors as *e. g.* hereditary influence, and similar glittering generalities. Of course, we do not necessarily have to have proof of severe septic disease during pregnancy in order to explain the development of an endogenous infection. It is conceivable that even slight general infection of the mother, which may not even attract her attention—such as a mild sore throat,—may affect the fœtus, as well.

Ectogenous infection of the cornea is not so easily explained. First of all, we are accustomed, at least in *primary* ulcer of the cornea, to presuppose a lesion of the surface epithelium through which the micro-organisms gained access to the deeper tissues. In the case of the fœtus it is not easy to understand how an injury can affect the admirably protected eyes, covered, as they are, by the tightly closed lids. If we give up the idea of a primary corneal affection and accept the hypothesis that it became involved in consequence of a conjunctivitis, we are met by the fact that congenital corneal changes, which according to Leber must be ascribed to an ectogenous infection, are seen much more frequently than those of the conjunctiva. Thus, in my three cases there was no conjunctival involvement to speak of. The objection that there might have been a pre-natal conjunctivitis which had healed by the time of delivery, is met by the common experience that severe infectious disease of the conjunctiva, especially gonorrhœal ophthalmia, shows no tendency to spontaneous healing.

It is a question whether amniotic fluid swarming with virulent pyogenic germs would be compatible with the continued health of the fœtus. Menge and Kroenig have shown that this fluid has a chemical composition fitting it to become an excellent culture medium for a host of ærobic and anærobic germs, including the streptococcus and staphylococcus. Their investigations were made in 21 cases of puerperal fever, many of which ended fatally. In my cases, the fact that all three mothers, according to their own credible statements. had an undisturbed puerperium does not seem compatible

with an infection of the amniotic fluid, unless we propound the somewhat fantastic hypothesis that after infection all the germs disappeared or lost their virulence before delivery took place. The question as to the possible bactericidal properties of the amniotic fluid is still an open one, and the present status of our knowledge of fresh congenital inflammations of the conjunctiva and cornea does not allow us to draw definite conclusions, from the clinical picture alone, as to the nature and origin of intra-uterine disease processes which have run their course. It certainly does not enable us to say with certainty in a case of ulcerative perforation of the cornea, with adherent leucoma and staphyloma, from which side the cornea was broken through. Stress must again be laid on the fact that so far there is no case on record in which unequivocal proof was brought of a fresh, non-perforating ulcer of the cornea, *i. e.*, of the surface. The anatomical and clinical data in regard to disease processes of the posterior surface of the cornea, on the other hand, are much more reliable though still scanty. Thus, Hippel reports the histological examination of the hydrophthalmic eyes of a child of 4 weeks with dense corneal opacities dating from birth, in which he found in conjunction with signs of an irido-cyclitis which had run its course, a flat ulcerative loss of substance on the posterior surface of the cornea. Almost identical changes are noted by Terrien in a case of double congenital leucoma of the cornea in a child which died 8 days after it was born. In the case of a child 3 days old, Tepljaschin observed parenchymatous opacity of the cornea which was found to be due to cellular infiltration of all the layers of the stroma, a deposit of inflammatory exudate on the posterior surface, and a defect in Descemet's membrane on one side. I, also, have found indubitable evidence of a receding irido-cyclitis with secondary involvement of the posterior layers of the cornea in the hydrophthalmic eyes of a child aged 7 days, which had a central corneal opacity.

The anatomical data reported above are completed by a number of clinical observations in which the positive diagnosis of an affection of the posterior surface of the cornea (so-called internal ulcer) could be made. Hippel describes 5 cases of this sort, all of them bilateral. The final outcome

was a very different one in the various cases, as some showed almost complete clearing of the cornea, while in others dense scars persisted. In one case increase of tension developed in one eye, with the formation of a maximal hydrophthalmus, while a marked enlargement of the cornea took place in the other. In 3 cases pyogenic corneal ulcers appeared during the course of the disease or some time after, leading in one instance to a complete destruction of the cornea with prolapse of the iris and extrusion of the lens, in spite of careful treatment in an institution. The development of corneal ulcers indicates, according to Hippel, that in affections of the posterior surface of the cornea there is an acquired tendency to ulceration on the anterior surface. This hypothesis seems to me superfluous, as I am convinced that the purulent destruction of the cornea was the direct result of the unusually dense infiltration of the stroma. The case proves to my mind that under certain circumstances a fœtal keratitis starting in the rear wall of the cornea may lead to perforation just as well as an ulcer of the anterior surface. If this be granted, we can no longer consider a congenital leucoma or staphyloma exclusively as the result of ectogenous infection, but must admit another possibility.

In view of the fact that we have so far no clear case of congenital ulcer of the corneal surface, while undoubted histological data prove the existence of congenital inflammatory affections of the posterior wall, I am inclined to the view of Gallenga and of Terrien, that the larger part of congenital leucomata on an undoubtedly inflammatory basis is due to a pre-natal inflammation of the anterior uveal tract with simultaneous or consecutive involvement of the cornea, and do not hesitate to attribute the opacities noted in my three cases to the same cause.

THE INFLUENCE OF PREGNANCY AND LABOR UPON DISEASES OF THE EYE.

By Dr. JULIUS FEJER, Budapest.

Abridged Translation from the German Edition, November, 1908, by Dr. Matthias Lancketon Foster.

GERMANN has raised the question whether the induction of abortion or of premature labor would be justified when the vision is endangered by the pregnancy. He enumerates all the diseases that are apt to occur during and be badly influenced by pregnancy, with special reference to retinitis albuminurica, detachment of the retina, choked disk, and the various forms of inflammation of the optic nerve. He reports also four cases of serious purulent keratitis in very emaciated women which began during pregnancy or lactation, and one case of choked disk and retinitis albuminurica which spontaneously recovered after delivery. From these experiences he comes to the conclusion that the preservation of the sight of the mother is of much more importance than the life of the child—that is, when the purulent keratitis due to the bad nutritive conditions, and the neuritis or retinitis caused by the pregnancy, can be checked or cured only by freeing the organism of the pregnancy or taking the child from the breast. At the end of his article he calls upon physicians to lay more weight upon the health of the eyes of the mother that they should not delay to induce abortion or premature labor when the vision of the mother is endangered.

Obstetricians have paid little attention to the question of the connection between pregnancy and diseases of the eyes, none to the indications for premature labor, but at the Con-

gress at Rome the indications were accurately stated. Schauta's standpoint is that eye diseases, with the exception of albuminuric retinitis and uræmic amaurosis caused by nephritis, indicate only in rare cases an artificial termination of the pregnancy. Chronic nephritis and the retinitis caused by it form unqualified indications for the termination of the pregnancy, as experience shows that the nephritis may get entirely well, or at least be greatly improved. In choked disk also the usefulness of termination of pregnancy may be granted, and finally it may be assumed in purulent keratitis that the special nutritive conditions of the eye will be favorably influenced by improvement of the general nutritive condition. Still more marked is the increase in strength and the improvement of the keratitis of feeble nursing women after stopping the lactation. In Russia the eye diseases caused by nursing, such as xerosis conjunctivæ et corneæ with hemeralopia, are very frequent because the mothers are in general badly nourished. Many ophthalmologists see in these diseases an indubitable indication for interruption of the pregnancy as early as possible, while others favor at first an expectant course. The overwhelming majority of observations and statistics refer to retinitis albuminurica.

Knies, Schmidt-Rimpler, Groenouw, Axenfeld, Silex, Cohn, Berger, and Runge have studied the connection of diseases of the eye with general and uterine diseases, and without exception declare that in all cases in which pregnancy is complicated by eye disease, particularly diseases of the retina and optic nerve, the nutritive condition of the mother, the condition of the vision, the objective changes in the fundus and their progress, the social conditions of the parents, and the desire of the mother must be taken into account. Only after a careful weighing of all these questions should one decide whether artificial termination of the pregnancy is necessary or not.

I have been unable to find anything in literature in regard to the effect of pregnancy on multiparæ with high myopia of both eyes and central chorio-retinitis. Four years ago a woman 35 years old, who had high myopia, came to me with her husband and asked what probable influence pregnancy would exert upon the progress of the myopia according to my

experience. The patient was two months pregnant and the mother of three children. Her husband, who was intelligent and not unskilled in the natural sciences, had observed that her myopia had increased greatly after each confinement. I had known the patient for two years and was firmly convinced that she was actuated wholly through apprehension of the loss of her sight. The vision of the right eye was $\frac{1}{10}$; $\frac{5}{50}$ with − 20. D; of the left $\frac{2}{10}$; $\frac{5}{30}$ with − 18. D. In the fundus there was a circular conus half the size of the papilla, and in the centre moderate chorio-retinal changes in both eyes.

After careful consideration of the facts I perceived that the people were right. We ophthalmologists instruct our patients with high myopia not to stoop much, not to lift heavy articles, not to strain at stool, all for fear that the blood pressure may be artificially increased thereby and hemorrhage or detachment follow in the diseased eye. Then we must conclude that nine months of disturbed metabolism, the clogging of the circulation of the blood, the straining during parturition, and particularly the abdominal pressure upon the patient cannot be irrelevant to the easily distensible eye. I therefore certified that the patient was suffering from high myopia of progressive character and told the couple that the pregnancy and delivery would favor the progress of the myopia and the central retinitis and possibly would endanger the vision. The attending physician was not satisfied with this opinion and very correctly called another ophthalmologist in consultation who concurred in my opinion. Abortion was then induced. During the three years that have since elapsed the myopia has not progressed.

At what time, after how many pregnancies, such advice should be given depends on the concurrent decision of the attending physician and of the ophthalmologist, on the objective conditions, and on the desire of the patient. The declarations of patients that their myopia advanced greatly after the first confinement and during the subsequent pregnancies, and that vision decreased from day to day, should not be passed by lightly.

Schoeler reports a case in which detachment of the retina took place during pregnancy, although no albumen could be found in the urine, was reattached after puncture of the

sclera, and became detached again before confinement. A sister of this patient was also blinded by detachment of the retina during pregnancy.

Some months ago, about 8 P.M., I was called in consultation to examine the eyes of a woman 22 years old, who had been married 10 months and had aborted 8 days before the sixth month of pregnancy as the result of influenza. The course of the abortion was smooth, the moderate hemorrhage had been checked by external massage, the temperature had risen to 37.6° C. only once during the eight days. But the patient had suffered from insomnia for several days, complained of lumbago and, for the last day, that she could not see well. The neurologist who preceded me could find no pathological changes either in her nervous system or in her eyes. I found the patient perfectly conscious, with undisturbed sensorium, the lids of both eyes much swollen, the right upper lid livid and covering the eyeball. Palpation of the lids showed that the swelling involved not only the skin but the deepest layers of the subcutaneous connective tissue; the œdema was doughy and hard. The swelling extended partially over the right side of the face even to behind the ear. There was great chemosis of both eyes; the swollen bulbar conjunctiva of the right eye almost completely covered the cornea. There was marked exophthalmos and the lateral movements of the eyeball were much limited. Examination of the fundus was very difficult, but revealed a high degree of œdema of the retina, both papillæ swollen to such a degree that their margins were scarcely visible and the origin of the vessels could be only guessed at. The patient could see objects and recognize persons, but an exact determination of the vision could not be made. From these symptoms I made the diagnosis of thrombosis of the cavernous sinus as the only condition that could produce so great a degree of stasis in consequence of which the escape of the venous blood was prevented not only from the lids but also symmetrically from the eyeballs. Six hours later the patient died from paralysis of the centre of respiration. The objective symptoms of thrombosis of the sinus had begun about 8 A. M., and developed so furiously that the clinical picture was complete 8 hours later. The bilateral exophthalmos, the œdema of the lids, the

chemosis of the ocular conjunctiva, the great œdema of the retina and papilla render the diagnosis positive, and the marked symptoms of stasis in the retina show that the thrombosis had extended to the ophthalmic vein. I repeat that during the entire eight days in bed the patient had been free from fever, her pulse and heart action had been normal, and that no thromboses elsewhere were demonstrated. It seems as though there must have been a causal connection between the abortion and the thrombosis. Septicæmic processes without febrile symptoms are among the most malignant, and we must assume such a process in this case when we seek for an explanation. The clinical picture is to be classed among the pyæmic rather than the marantic forms. A case described by Ehrendorfer may be classed in the marantic group. A primipara 22 years old collapsed on the tenth day after delivery, had convulsions, paralyses of the extremities, symptoms of intracranial pressure, and died in 17 hours. The temperature did not rise above 37° C. The eyes were not affected. Autopsy showed that the falciform and transverse sinuses as well as the left jugular vein were occluded by a blood clot in which no trace of pus was found. The author considers the case marantic, and ascribed as the cause the changes in the blood during pregnancy, the disturbances occasioned by delivery, and the changing back of the circulation. He claimed from certain peculiarities of the veins that their endothelium became diseased during pregnancy, so that they accumulated leucocytes, which gave rise to the blood clots.

THE PATHOGENIC ELEMENT OF TRACHOMA

By Dr. ADDARIO, Palermo.

Translated by Dr. Matthias Lanckton Foster, from the German Edition, September, 1909.

(With eight figures in the text.)

I.—Prowazek's Bodies.

WITHIN the past two years the question of the etiology of trachoma has entered a new phase. In 1907 Prowazek described certain little bodies found in the epithelium of the trachomatous human conjunctiva, a kind of chlamydozoa he called them, which he considered specific for trachoma because he also found them in trachoma experimentally produced in monkeys. Confirmation came from Greeff in conjunction with Frosch and Clausen, from Disanto, who found the bodies in the interstices of the tissue of the trachomatous follicle, and shortly afterward from Bertarelli and Cecchetto in Italy and Mijaschita in Tokio. I have studied this new condition in trachoma and have compared these bodies with the similar ones which are to be met with in the epithelium of the normal, or ordinarily inflamed, conjunctiva.

Mijaschita and Bertarelli have likewise made such comparisons. According to the former, the little bodies are so similar to Prowazek's and so numerous that frequently a differentiation between them is difficult. After a searching study of the question, he grants their identity as to color, form, size, arrangement, and position, and differentiates them only by their homogeneous appearance, *i. e.*, by the absence of the dark, or dark red, granules which form the characteristic of Prowazek's bodies.

Bertarelli and Cecchetto confirm the rarity of Prowazek's bodies and their inconstancy, 6 times in 16 cases of trachoma, but consider them specific for trachoma. They found also in the epithelium of the trachomatous conjunctiva and within the cell protoplasm, together with Prowazek's bodies, other round or oval little bodies, consisting of a slightly dark blue or violet ground substance containing rose-violet granules. These differed from the protoplasm granules and gave the impression that their accumulation compromised the nucleus, deformed it, and dislodged it toward the periphery. These little bodies do not agree with those of Prowazek.

In the experimental trachoma of monkeys then both authors met with forms which according to them certainly gave the impression of karyorexis and karyolysis. While these were taken by Prowazek for masses of plastin, they come to the conclusion that not all the formations described in trachoma can be referred to Prowazek's bodies. They have studied cases of septic conjunctivitis in rabbits and of blennorrhœa in men, in which they have observed in the cells of the conjunctiva an aggregation of fine, red-stained granules, the parasitic nature of which is questionable. The differentiating mark of the little bodies of the same form met with in common conjunctivitis and in the normal conjunctiva given by Mijaschita, the absence of dark granules, is not confirmed by Bertarelli and Cecchetto.

Things were at this point when I undertook my studies for the purpose of ascertaining the peculiarities of Prowazek's bodies in their details and to differentiate them if possible from the little bodies which are so often met with in the protoplasm of the epithelial cells of the normal conjunctiva and in common conjunctivitis. I have studied five cases of typical acute trachoma with distinct follicle formation, the trachomatous nature of which was proven by the presence of the characteristic corneal pannus. An elective stain without precipitate was produced by the use of a very thin Giemsa solution, 10 drops in 100g of distilled water. I scraped the surface of the upper tarsal conjunctiva with the edge of a cover glass and immediately spread the substance so obtained with a very fine platinum wire. The preparation was allowed to dry two or three minutes in the air and was then

fixed by immersion for eight or ten minutes in equal parts of absolute alcohol and ether. After the hardening fluid had evaporated from the surface of the glass, it was placed for twenty-four hours in the above-mentioned solution. It was then rinsed off, dried in the air, and enclosed in neutral balsam or in cedar oil. The observation was made by the aid of an electric light of 25-candle power at a distance of 40*cm*, and with a $\frac{1}{18}$ immersion. For the positive recognition of the forms described by Prowazek one must be familiar with all the different changes which can be produced in the epithelial cells of the conjunctiva during the preparation. Many cells show a distinct artificial rupture of the nuclear membrane with partial extrusion of the nuclear substance, which may assume the most unexpected and varied forms that betray their origin by their continuity with the cell nucleus. It is not equally easy to recognize the nuclear nature of these masses when there is a line of separation between them and the nucleus; in these cases the rupture of the nucleus probably took place during life, so that the masses extruded from the nucleus have suffered changes in form, appearance, and staining capacity.

In the cases of acute trachoma, Prowazek's bodies were scantily found in the cell protoplasm of the conjunctival epithelium of the upper tarsus, one or two in each preparation rich in epithelial cells. The form may be spherical, oval,

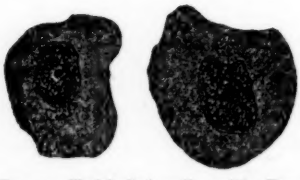

FIG. 1. Epithelial cells with Prowazek's bodies from two cases of acute trachoma (× 1200)

crestlike, or like a stiff hat. They vary in size, but are never as large as the nucleus (Fig. 1). They lie about the cell nucleus, just separated from it usually by a line of protoplasm, sometimes by a layer of a certain thickness. Their

color, stained with Giemsa solution as above described, is violet or reddish-violet. Their appearance is almost granular and frequently wrinkled, so that they remind one of little mulberries. The contents can be differentiated distinctly into two parts: a uniform ground substance of reddish violet color and very minute dark granules which resemble blue or dark red cocci or diplococci embedded in the ground substance. Beside these little bodies of certain form and size, red granulations were found in a small number of epithelial cells, distributed in large numbers and occupying one end, or the greater part, of the protoplasm. These granulations appear blue when in masses. It is my opinion, contrary to that of Mijaschita, that these have nothing in common with Prowazek's bodies. The epithelial cells of the conjunctiva physiologically possess a secretory function in the formation of mucous granulations which become exaggerated in pathological conditions. These granulations are at first acidophile, then, in the masses that they always form, basophile, and form the well known mucous spheres, which have been observed in the goblet cells of the conjunctiva in the normal and pathological condition.

In addition to acute trachoma I have studied various cases of the mixed and follicular forms. Of the latter I have chosen cases in which the presence of the corneal pannus excluded the possibility of a confusion with Saemisch's chronic folliculitis. By means of the technic already given I ascertained the presence of the customary little bodies, which were similar in form, size, stain, appearance, and contents, to those found in acute trachoma. The crest-shaped bodies were more frequent and the black granules within them showed more clearly the diplococcus arrangement (Fig. 2).

After finding Prowazek's bodies in the different clinical forms of trachoma, I wished to ascertain by what peculiarities to differentiate them from the little bodies described by Bertarelli and Cechetto as well as by Mijaschita in the epithelium in ordinary conjunctivitis. For this purpose I chose three cases of diplococcus conjunctivitis, diagnosed as such by examination of the secretion, two cases of conjunctival catarrh bacteriologically negative, and two cases of ophthalmia neonatorum. The same technic and staining

were used and the observations were made under the same conditions of illumination and with the same immersion

FIG. 2. Epithelial cells with Prowazek's bodies from a typical case of follicular trachoma

objective. In the preparations from the diplococcus conjunctivitis I found, together with many ruptures of the nucleus produced during the manipulation, a number of little bodies, four or five in each slide rich in cells, each embedded in the protoplasm of an epithelial cell (Fig. 3). They were

FIG. 3. Epithelial cells with Prowazek's bodies from two cases of catarrhal conjunctivitis due to the diplococcus

round, oval, crest-shaped or stiff-hat-shaped, presented the same appearance and took the same stain as those found in trachoma. They not only consisted of a ground substance of violet or reddish violet color, but appeared strewn all over with very minute granules usually stained dark red, sometimes blue. The presence of these granules in the little bodies confirmed the observation of Bertarelli and Cecchetto, although these authors did not acknowledge the identity of these little bodies with those of Prowazek; and contradicts the homogeneous appearance described by Mijaschita as that

of the little bodies in ordinary conjunctivitis. There were also present some wrinkled granules, such as Prowazek compared to little mulberries.

In both cases of blennorrhœal conjunctivitis I found little bodies similar to those in the diplococcus conjunctivitis, likewise containing very minute dark red granules. In the two cases of subacute conjunctival catarrh bacteriologically negative I also found the usual little bodies embedded in the protoplasm of the conjunctival epithelium (Fig. 4). These

FIG. 4. Epithelial cell with Prowazek's bodies in a case of acute catarrhal conjunctivitis bacteriologically negative

were always differentiated from the manifold formations or partial ruptures of the nucleus produced during the preparation.

The similarity between Prowazek's bodies and those of common conjunctivitis seemed to render it advisable to determine whether similar little bodies are normally present in the epithelium of the conjunctiva, the more so that others had instituted investigations in this regard. The same technic in fixation, staining, and observation was employed, so the results are comparable. I had no great trouble in finding a number of enclosures in the protoplasm, 3 or 4 to each slide which had the forms above studied, were of different sizes, lay more or less close to the cell nucleus, were of fairly violet color, some smooth, some wrinkled, strewn with sometimes few, sometimes numerous little points recognizable by their dark or dark red stain (Fig. 5). As was to be expected, epithelial cells were met with containing a great number of acidophile granulations diffusely scattered throughout the greater part of the protoplasm, which indicated the secretory or mucous function of those cells.

The above observations show that the granular little bodies in the protoplasm of the conjunctival epithelium are a normal condition and are of no pathogenic value either in trachoma or in the other forms of conjunctivitis in which

FIG. 5. Epithelial cell with Prowazek's bodies from different normal conjunctivas

they may be met with. I will not pass any judgment here concerning the physiological signification of these bodies which, on account of their frequency, may be cell enclosures and also represent products of karyorexis, but must certainly be differentiated from the artificial ruptures of the nucleus during the process of preparation.

II.—THE BLASTOMYCETÆ OF TRACHOMA.

My attention has been repeatedly directed during the past ten years to those hyaline little bodies which are so frequently to be met with in the trachomatous conjunctiva, either isolated or in groups; but I have never attributed importance to this condition, because it is met with in many other proliferative diseases of our organism. Sanfelice has recently taught us new facts concerning the biology of blastomycetæ, principally that the degenerative phase commences early in the life of pathogenic blastomycetæ and therefore after a brief existence of a few weeks they can no longer be cultivated. His investigations show further that the polymorphism is characteristic of the morphology of this nature of plants, that the most different blastomycetæ biologically and pathogenetically are alike morphologically; that the toxin obtained from some blastomycetæ (saccharomyces neoformans of Sanfelice) exerts a special irritant action upon the tissue cells and brings forth true new formations; that the hyaline bodies so often met with in many processes of proliferation (Russel's bodies) are the products of degeneration and destruction of blastomy-

cetæ. These data induced me to turn my attention to the blastomycetæ of trachoma.

Gonella found in seven out of eight cases of trachoma bodies with the properties of blastomycetæ, round, exceptionally ovoidal, *i. e.*, cells sometimes single, sometimes in pairs, sometimes in little groups, varying greatly in size, some as large as an epithelioid cell, some as large as the nucleus of a leucocyte, some even smaller. The larger cells showed, he said, an intensively stained peripheral zone which gave the impression of a membrane with a double contour. He found neither granulations within these bodies nor forms of proliferation, and conjectured that they were composed of a hyaline or colloid substance. Cultures were negative.

Guarnieri (1896) studied 14 cases of trachoma. He found both in the interstices and within the cells bodies of various sizes, some round, some oval, some with bud-like processes, some with a membrane, but for the most part without a double contour. The single bodies reached a large size, while those in groups were smaller and sometimes so small as to resemble cocci. They were abundant in the fresh cases of trachoma, particularly at the places where the cell proliferation begins, very sparingly present in the old granulations and still more sparingly in the cicatricial phase. He was unable to obtain cultures of these elements, so he believes that they possess all the characteristics of the blastomycetæ.

Recently (1908) Lodato found, during the examination of sections of trachoma stained by Mann's method, in the adenoid layer of the infiltrated conjunctiva and within the trachomatous follicles, little red-violet bodies varying in size from that of a little granule to that of an erythrocyte. They were usually extracellular, but the smaller were mainly intracellular. They differed from the bodies described by Gonella yet possessed similar properties and were considered blastomycetæ. In my opinion it is sufficient to possess some familiarity with the histology of trachoma in order to recognize that these homogeneous, spherical granules of different size, some isolated, some characteristically grouped together, are all of the same nature. I do not doubt that the little bodies described by Gonella, Guarnieri, and Lodato are the

same as the little hyaline bodies wdich have been seen by all observers in the trachomatous conjunctiva.

During the past two years I have turned my attention to the anatomical study of the form of corneal trachoma clinically known as pannus crassus. The material from seven cases hardened in sublimate and stained with Heidenhain's iron-hæmatoxylin enabled me to study together with the histology the blastomycetæ, because this stain is elective and specific for the latter. They remain intensively and uniformly black even when decolorization is carried so far that only the nuclear granulations of the tissue cells retain their stain. The question of the etiology of this disease receives light from this study so far as the hyaline bodies are explained. In the neighborhood of the follicles in the most superficial layers of the parenchyma of the cornea, particularly where the cell proliferation is liveliest, lymph spaces are to be seen, the lumina of which are filled by heaps of elements of different sizes stained black, some oval, some round, some kidney-shaped, some joined in pairs. Each body presents a distinct membrane showing a double contour intensively stained by eosin (Figs. 6 and 7). In the peculiar

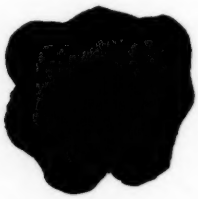

FIG. 6. Blastomycetæ in the follicles of corneal trachoma or pannus crassus

FIG. 7. Blastomycetæ in the follicles of corneal trachoma or pannus crassus, Subl., Iron hæmatox., Eosin (×600)

follicular tissue of the pannus crassus, and particularly in the interstices which separate the large lymphocytes of epithelioid appearance, are encapsulated blastomycetæ, most often singly. Very minute oval forms are also to be seen here of about a quarter the size of the nucleus of a lymphocyte.

Each of these elements is enclosed in an enormously thick capsule with concentric layers, which is easily stained with eosin (Fig. 8). The presence of this membrane, the bud

FIG. 8. Blastomycetæ in an enormous laminated capsule.

formations, the polymorphism and their very different sizes leave no doubt that they are blastomycetæ. I propose to continue these studies and to repeat the hitherto fruitless attempts at culture.

REPORT OF THE PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By Mr. C. DEVEREUX MARSHALL.

An ordinary meeting of the Society was held at the Medical Society's Rooms, Chandos Street, W., on Thursday, May 5, 1910. Dr. G. A. Berry, President, in the chair.

Mr. Bishop Harman showed a case of **paralysis of external rectus,** the result of an accident.

Mr. Treacher Collins exhibited a case showing yellow patches scattered through the iris tissue, in the stroma. Mr. L. V. Cargill showed a patient with **acromegaly,** and Mr. M. S. Mayou two cases of **heterochromia iridis,** associated with paralysis of the cervical sympathetic in early life. Mr. Tomlinson showed, and illustrated by the epidiascope, recent **amaurosis** with unusual cupping of the disk, in a youth; and Mr. A. S. Worton a case of **congenital arterial loop projecting into the vitreous.**

Colonel H. Herbert read a paper on the **small flap incision for glaucoma.** Two years ago Mr. Herbert performed a small operation upon eight glaucomatous eyes, which had been described already briefly as a form of subconjunctival paracentesis. By means of a narrow Graefe knife a small rectangular sclero-corneal flap was cut subconjunctivally, with its base at the limbus. This flap might be forced forward a little under the conjunctiva, by the intraocular pressure. And probably it tended to shrink slightly in volume through being deprived of its direct blood-supply for a time. Firm reunion appeared to have been thus prevented. The results up-to-date were available in six only of the eight cases. One case was a failure owing apparently to adhesion of the

iris to the wound. In the remaining cases the tension had been reduced to normal by means of linear filtering cicatrices. In two of the cases however the complete reduction of tension had occupied a period of a few months. The leakage of aqueous was at first insufficient. Two of the patients were shown at the meeting. During the last five months Mr. Laws and Mr. Herbert had been operating by means of a similar flap, but broader and hence placed usually above, owing to the possible need of iridectomy, basal or complete, to prevent adhesion of iris to the wound or prolapse. These incisions had been made mostly by means of keratomes and of bent, narrow, blunt-ended knives. Flaps also 2–3*mm* wide had been utilized in some cases, made with the narrow Graefe knife at the outer side of the cornea. It was too early to say more about the results of Mr. Herbert's 14 recent cases than that they were very encouraging. In two cases adhesion of iris had formed to both limbs of the small section, yet had not interfered appreciably with filtration. Combined iridectomy, peripheral or complete according to the state of the iris, appeared advisable with the broader incision in cases in which the pupil did not contract well to eserin. It had been performed in 3 cases only in this series, and secondary iridectomy two days later in one case. By this operation an attempt was made merely to secure with certainty and safety the same linear filtering cicatrix which was sometimes the chance result of an ordinary iridectomy operation. The length and peripheral position of the typical iridectomy incision favored gaping of the wound, and thus tended to produce a filtering scar. In Mr. Herbert's experience a filtering or fistulous cicatrix was the rule after a successful iridectomy, and in itself was sufficient to account for the success. Mr. PRIESTLEY SMITH said he had been struck by the success of the operation and the small degree of disfigurement caused. Mr. ALLPORT had, under his—Mr. Smith's—control, operated by the method upon eleven eyes, without any failure; and he, the speaker, regarded it as a very valuable improvement in the methods of treating chronic glaucoma, and congratulated Colonel Herbert upon it. Mr TREACHER COLLINS had had no experience of the operation, but desired to know the anatomical difference between a filtration scar and a fistulous

scar. Mr. F. R. Cross agreed that the establishment of a fistulous opening made a permanent result more likely after operation for glaucoma than without such. Dr. Laws said he had done the operation 14 times, and gave the results. There had been no failure or harm in any case. Sometimes, owing to progressive loss of vision, one had to try other methods. Mr. Allport gave the satisfactory account of 20 cases on which he had done the operation.

Mr. Herbert Fisher read a paper on **congenital word-blindness** (inability to learn to read). After alluding to some of the previously reported cases of the condition, Mr Fisher reported four others which had come under his own observation in one girl and three boys. In one of the male cases there appeared to be very suggestive evidence of a hereditary and family tendency to the defect; in another there had been considerable flattening of the left side of the cranium at birth, and a remnant of this deformity could still be easily recognized. Mr. Fisher thought it probable that as further examples of the defect were collected the cases would be found to range themselves into two groups: (*a*) the hereditary group, in which the visual memory centre for words residing in the left angular gyrus failed in development; probably in this group a considerable proportion of the female cases would be found; (*b*) a group due to limited meningeal hemorrhage over the same gyrus, the result of birth injury. This group would account for the well recognized great preponderance of congenital word-blindness in the male sex. Obstetricians recognized the greater size of the head in male than in female infants at birth, the more frequent necessity for artificial assistance, and the greater risk to mother and to infant in the birth of male than of female children. Mr. Fisher pointed out that larger meningeal hemorrhages at the time of parturition and resulting in birth palsies are twice as common in male as in female children. Mr. Fisher urged the necessity for special and private tuition for children with this defect of congenital word-blindness. He thought the phonic method of learning to read, making use of the glosso-kinæsthetic centre to aid the visual memory centre, less likely to lead to a satisfactory result than endeavors to train a vicarious visual memory centre in the right hemisphere;

for such training he advocated the "look and say" method of learning to read; the child should use the "word" as its unit of observation and study, and not the individual letters. The "look and say" system had been practically developed by Miss Mason of 56 Pomola Rd., Herne Hill, S. E., in her "Delightful Reading Box" system, which Mr. Fisher had used with most satisfactory results in one of his cases reported to the meeting.

Dr. F. E. BATTEN discussed the paper, pointing out that Bastian, long before 1900, described the condition and reported cases. He, Dr. Batten, thought it difficult to explain word-blindness on the hypothesis that there was an actual defect in the angular or marginal gyrus. Bastian's view was that it was really a commissural defect. Such cases could, as a rule, read figures well; and he knew the case of a butcher boy who could remember accurately the various orders given to him on his round and deliver the meat properly to the respective houses. He, Dr. Batten, was very favorably impressed with the method of teaching such children, which had been described by Mr. Fisher.

Mr. TREACHER COLLINS said he had seen many cases of the condition and had been surprised to find how common it was. They were frequently overlooked, and attributed to sheer stupidity, to the great discomfort of the child. Several of the patients he had seen had been atrocious spellers. If the British system of spelling had been phonetic, the defect would not be nearly so noticeable. In Germany, the language there being much more phonetic, such cases were said to be far less common. He thought they had sufficient visual memory for words to enable them to recognize words when they saw them, but not sufficient to recognize when a letter in the word was out of place or omitted. Some could learn by ear, but not from books. Mr. R. W. DOYNE objected to the name "word-blindness," and he thought the condition was more common in boys than in girls. The defect was a question of degree and was not regarded as pathological. Those who were word-blind would read their lessons aloud so as to learn them. Mr. Fisher replied.

Dr. A. BRONNER (Bradford) read notes on six cases of **hypopyon keratitis treated by local applications of pyocya-**

nase. Many cases of ulceration of the cornea, especially in elderly people, were most difficult to cure, and often ended in complete destruction of the cornea. In some recent cases Dr. Bronner had applied 50% pyocyanase eye-drops every hour. In every case the pain had disappeared in a day or two, and the ulcer had healed up more quickly and with less consequent opacity of the cornea than under the ordinary method of treatment (galvano-cautery, carbolic acid, sub-conjunctival injections). Of course atropin drops and hot fomentations were also used.

Pyocyanase was a brownish fluid prepared from broth cultures of the Bacillus pyocyaneus, as suggested by Emmerich and Lowe, by the Institute of Bacterio-therapeutics, at Dresden.

REPORT OF MEETINGS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. EDWARD B. COBURN, Secretary.

STATED MEETING OF THE ACADEMY, MONDAY, MARCH 21, 1910. DR. H. W. WOOTTON, CHAIRMAN, PRESIDING.

Dr. J. H. CLAIBORNE presented the **case of orbital tumor after operation** which was shown at the previous meeting. An incision was made through the brow and underlying tissues; the tumor was found behind the lachrymal gland and attached to the periosteum of the roof of the orbit, extending back to the apex of the orbit. The growth was encapsulated. Vision before and after the operation was $\frac{20}{200}$. At present there is almost complete ptosis and anæsthesia to the outer side of the supra-orbital notch. Motions of the eye which before were limited are now normal.

Dr. E. L. OATMAN stated that the tumor on examination proved to be a cylindroma.

Dr. J. E. WEEKS thought that these tumors were fairly well known as alveolar sarcoma. He referred to a case reported by Dr. Wilson in which the growth was half the size of his fist and was composed of hyaline cylinders. These growths are usually benign and seldom return.

Dr. J. W. CASSELL presented two cases of **cataract operated upon by the Kalt method of sclero-corneal suture,** and reported seven cases in all in which this operation had been performed. He reviewed the experimental work of Dr. W. H. Bates on rabbits' eyes and referred to the 48 cases operated on in this manner by Dr. H. W. Williams who was the first to do this operation on the human eye in 1867. The different methods of making the suture were fully described.

All agree that the suture should not penetrate the anterior chamber. The first case was a lens dislocated into the vitreous. The suture was applied, a simple extraction was performed, the lens being removed with a hook and loop. No vitreous was lost. The second case was a lens dislocated forward. The third case had a rigid pupil and an iridectomy was done, but as in the last case extraction was easily accomplished with good result. The next two cases suffered loss of vitreous but were saved by the suture. The next two cases were simple extractions with perfect results. He cites certain advantages of this operation, viz.: the safety of performing simple extraction, reserving iridectomy to special cases. The sound eye may be left free and the patient is not confined to lie on his back but may sit up on the second day, a matter of considerable importance in elderly persons. Greater safety to the eye is also insured. Although he has had no experience with the suture in cases of intraocular hemorrhage, he concludes from Bates's results that the suture may act as a safeguard against this calamity.

Dr. J. E. WEEKS thought the results obtained by Dr. Cassell were very beautiful. He had used the Kalt method in a few cases.

Dr. O. SCHIRMER said he had seen Dr. Kalt operate on 12 or more cases in this manner, but at that time none of Kalt's associates employed it. He does not think it should be employed in every case, but be reserved for complicated cases.

Dr. C. B. MEDING had also seen Dr. Kalt operate in this way. It was his personal opinion that the one thing common to successful extractions is a perfect section. The section is far more important than other little mannerisms.

Dr. CASSELL, in closing the discussion, said that Dr. Valude and Dr. Chevallereau, associates of Dr. Kalt, now do this operation.

Dr. PETER A. CALLAN presented two cases of **blindness from wood alcohol** and reported two other cases. The first case, a Russian, aged 47 years, always drank, more or less. One noon, after taking his usual morning drink, he had severe headache, with nausea and vomiting. On awaking the next morning he could scarcely distinguish daylight and his head and stomach still continued to bother him. When first

examined he had no light perception and the pupils were immobile. The optic disk was red, but there was no blurring of the outlines. The veins were somewhat overfilled. Now the nerve heads are slightly pale and the color fields for red and green are inverted, but there are no scotomata. Vision gradually improved and is now $\frac{20}{20}$ in each eye. The second case was an Italian, aged 24 years. He was addicted to the use of anisette and took 9 or 10 ounces just before the attack. This began with headache, nausea, and vomiting, and sight began to fail, the patient being totally blind when seen 5 days before the onset of the trouble. The optic disk was hyperæmic, the veins were enlarged, and the pupils were immovable. The fields for red and green were inverted and there were no scotomata. When last seen the vision was $\frac{10}{15}$. Another case in the person of a Russian, aged 63 years, was reported, who drank considerable quantities of beer and schnapps. One day, on arising, he complained of headache with nausea and vomiting and with only perception of light. The pupils were sluggish, the nerve-heads hyperæmic, veins swollen, and only perceived motions of the hands. He would not remain in the hospital, and when seen after some weeks vision had risen to $\frac{20}{50}$ and $\frac{20}{70}$ and the nerves were pale. Later he appeared again because of failing vision, which was then $\frac{20}{100}$ and $\frac{20}{200}$. Another case was reported of an Italian who drank two small glasses of anisette and on arising next morning he had malaise, headache, nausea, and vomiting, and was blind. Some time later he was seen again and vision was $\frac{20}{200}$. The nerves were pale and the arteries were small. Dr. Callan said he had abandoned the use of potassium iodide and strychnin as a routine method of treatment and depended on the skin, bowels, and kidneys to eliminate the poisonous material. He used cathartics, diuretics, and diaphoretics, including pilocarpin and hot baths, and attributed the complete restoration of vision which he had secured in some of these cases to this method of treatment. He was aware that there is often temporary improvement, but he thought the deterioration in the more favorable of these cases would not be very serious, not worse than $\frac{20}{50}$.

Dr. CARL KOLLER presented a case of **methyl-alcohol poisoning with sudden blindness** occurring in a woman, aged

42 years, who once a day drank a small quantity of brandy, about 2 drachms. She was suffering from cholelithiasis, which made her especially susceptible to the poison. The ophthalmoscope showed marked papillitis with narrowed arteries and enlarged and tortuous veins. Dr. Koller pointed out that in the cases with intense swelling of the optic nerve there was not only an affection of the ganglion cells but also of the bloodvessels, which latter was the cause of the papillitis.

In discussing the cases of Dr. Callan and Dr. Koller, Dr. I. M. HELLER said that many of the adulterated liquors contained only 6% of wood alcohol. He reported a case of a woollen tester who took only a ½ teaspoonful and who became nauseated, vomited, and totally blind. Dr. Leszynsky also saw the case.

Dr. E. L. OATMAN presented a case of **atrophy of the choroid in a diabetic.** The patient, a woman 53 years old, well nourished and in apparent good health. Examination of the urine showed sugar, 9%. Failure of vision was first noticed two years ago. Vision: O. D., counts fingers at 2 ft.; O. S., $\frac{20}{70}$. Ophthalmoscopic examination shows almost complete depigmentation of the fundus. The choroid is plainly seen. The choriocapillaris and many of the medium-sized vessels have disappeared. The disease process is most marked at the posterior pole and less so toward the periphery. The disk is surrounded by a broad, white zone in which only traces of bloodvessels are visible. The optic nerve is poorly outlined. The fovea has offered some resistance to the degenerative process and it appears in the midst of a highly atrophic area as a reddish spot, speckled with pigment. No pathological changes were discovered in the retinal vessels, though no light streak was observed except on the disk and over areas of choroid which still retained a reddish color. The pigment from the retinal epithelium had disappeared without wandering forward over the retinal vessels, and in some places its supposed remains appear like a sprinkling of black pepper. Occasionally choroidal pigment is seen around a vessel, but it does not appear to clump. Exudative inflammation and hemorrhage are absent. The vessels of the choroid do not exhibit white walls as in the familiar form of choroidal sclerosis. The left eye is in an earlier stage of

the disease. Depigmentation analogous to that seen in this case occurs in diabetics after iridectomy, when loosening and discharge of the uveal pigment ensues and is often sufficient to render the aqueous quite dark.

Dr. H. H TYSON presented a case of **atypical exophthalmic goitre with ocular palsies.** The patient, a German, aged 55 years, was first seen in July, 1909, at the New York Ophthalmic and Aural Institute, complaining of seeing double. Paralysis of the 6th and 4th nerves of the left was found and, the history being negative, he was placed on potassium iodide which he took for about three months and then disappeared. He returned in January, 1910, stating that he had been treated in two other dispensaries with iodides and inunctions of mercury, but was getting worse. At this time his eyes were very prominent, due to marked retraction of the upper lids, and he had additional palsies. Pulse was 130, and he had profuse sweating, great weakness, was very nervous, and suffered from insomnia. He stated that two sisters had had large lumps in the front of their necks, but their eyes did not bulge. A diagnosis of atypical Basedow's disease was made, and he was referred to the Vanderbilt Clinic for serum treatment. He was given several treatments and was then seen by Drs. Janeway, Evans, and Williams who concurred in the diagnosis. Treatment to improve his general health was given and he gained 6 lbs. in three weeks. In February his pulse varied from 92 to 104. March 4th saw further improvement, but he still gets tired easily. No enlargement of the heart. Tremor gone and less nervous. Vision, O. D. $\frac{20}{20}$ and O. S. $\frac{20}{40}$. Fundus: slight venous stasis. Eyes protruded somewhat, lids markedly retracted. Paralysis of all the muscles of the left eye except the internal rectus (partial). Paralysis of the superior rectus and inferior oblique and inferior rectus, and partial paralysis of the internal rectus. Posey's and Spiller's text-book records about two dozen cases of partial or complete ophthalmoplegia externa, and Bashan has collected a number of cases of palsy of single ocular muscles in which occurred paralysis of the internal rectus, 7; external rectus, 12; superior rectus, 6; trochlearis, 1; levator palpebræ, 1; and 7 cases of diplopia in which the muscle involved was not determined. The points of interest are,

first, that the first sign of the disease was a paralysis of the fourth and sixth nerves, followed three months later by other manifestations of Basedow's disease; second, that the ocular palsies remained stationary although the general health and symptoms improved; third, the complete inability to turn the eyes upward.

In the absence of Dr. W. B. MARPLE, Dr. E. B. COBURN presented his case of **coloboma of the crystalline lens.** The patient, a young boy, showed a defect in the lower margin of the lens; the lens was drawn upwards and the fibres of the zonule could be plainly seen stretching across the pupillary area.

Dr. L. W. CRIGLER presented a case of **keratectasia** following **interstitial keratitis.** The patient, a girl aged 18 years, was first seen at the Manhattan Eye and Ear Hospital on October 15, 1909, and showed a typical and well-marked case of interstitial keratitis of both eyes, the disease having first been noticed two months before. She was given mercurial inunctions and potassium iodide and hot applications, but became gradually worse. Salicylate of soda was then substituted for the mercury. The infiltration and vascularization grew worse and the stroma of the cornea gave way. Following ectasia the eye became hard and painful. Atropin was stopped and a pressure bandage applied, but the tension did not diminish. An iridectomy was attempted January 26, 1910, but the pupil was found to be extremely dilated and the iris was adherent in the angle. The eye remained quiet as long as the wound was kept open, but the wound finally closed, and on February 16th the tension again rose and a paracentesis was performed. Since that time the eye has remained quiet. Two points were emphasized: first, that the increased tension was not observed until the ectasia had developed; and second, that the fellow-eye responded promptly to the specific treatment.

In discussing this case, Dr. J. E. WEEKS said that he has seen a case which involved both corneæ, and the tissue was so thin that when making an incision the cornea collapsed. The patient now has good vision, $\frac{20}{40}$ for distance, and reads Jaeger I. This condition results in quite a large percentage of the cases.

Dr. P. A. CALLAN said that in all severe cases of interstitial keratitis there is some ectasia, but this case was the most severe he had ever observed. It was generally due to softening of the tissues and the giving way to pressure.

Dr. E. L. OATMAN said that he remembered that the disease began in both eyes.

Dr. CRIGLER asked the cause of the increased pressure.

Dr. H. W. WOOTTON replied that the iris was bound down to the lens and so prevented the escape of aqueous.

Dr. WEEKS said that there is an obstruction in the spaces of Fontana by the disease process so that aqueous could not escape through the angles of the anterior chamber.

Dr. E. B. COBURN presented a case of **retraction movement of the eyeball.** The girl, aged 14, was observed to have defective eyes at birth, which the mother ascribed to an injury to the abdomen which she had received in the eighth month of pregnancy. Face presentation required turning. Last summer two operations were performed on the eye, but the condition had been made worse, as movements of the eye were now more restricted. The left eye is turned outward, the head being turned to the right for compensation. Movement of the eye is limited, and inward it only moves to the median line and then turns upward, the upper axis of the eye turning outward. At the same time the eyeball retracts and the palpebral fissure becomes narrower. Vision is normal with plus lenses which she has been wearing for four years. She complains that her forehead swells and becomes red at times and she has almost constant headache. Examination of the nose was negative. Diplopia is present except in one position.

Dr. J. E. WEEKS said that he had observed two cases which had been reported in Dr. Duane's paper on the subject.

Dr. FRANCIS VALK asked if any attempt had been made to move the eye by the aid of forceps. In his own case the eye could not be moved in but could be moved backward. He thought it was an unusual development of the check ligament.

Dr. WEEKS said that an inelastic band was usually found on dissection. The external rectus was usually weak or paralyzed and the internal rectus was found attached far back.

Dr. H. W. WOOTTON said that he had seen and dissected a similar case.

In the absence of Dr. J. H. WOODWARD, his specimens and photographs of cases of **melano-sarcoma of the choroid** were presented by Dr. E. M. ALGER. The cases were as follows:

1. Gliosarcoma of the retina in a child aged 4 years. The growth was apparently confined to the eye, but relapsed six months later in the orbit, which was exenterated one month later. Relapse followed and the child died six months later.

2. Patient, aged 58, had anterior chamber shallow, lens cataractous and dislocated forward, and T+1. Fundus invisible. Eye enucleated and tumor, melano-sarcoma of mixed-cell type, was found. No relapse. Patient died of acute pulmonary disease.

3. Age 51 years. Flashes of light for six months. Chronic diabetes mellitus. Diagnosis, sarcoma of choroid. Enucleated. Relapse in 1 year and 7 months.

4. Age 40 years. R., glaucoma and excavation of the disk, with plus tension and some choroiditis. L., subacute glaucoma. Iridectomy R. and L. at intervals. R. fundus invisible from cataract. Tension+. Cataract removed but eye still painful. R. enucleated with growth in orbit. No relapse when seen one month later.

5. Age 35. L., blind and later became painful; anterior chamber shallow, pupil semi-dilated. T+1; no fundus reflex, eyeball tender, transillumination negative. Diagnosis, secondary glaucoma from intraocular neoplasm. Eye removed. No extension into the orbit. Melano-sarcoma of the choroid and two tumors of the retina.

Dr. J. E. WEEKS called attention to the well-known constriction of the tumor where it passes through the lamina vitrea.

Dr. D. T. VAIL of Cincinnati read, by invitation, a paper entitled **The Major Smith method of extraction of cataract in the capsule** and illustrated it with stereopticon pictures.

MEETING OF MONDAY, APRIL 18, 1910, DR. H. W. WOOTTON, CHAIRMAN, PRESIDING.

Dr. H. H. TYSON was appointed Temporary Secretary in the absence of the regular Secretary, Dr. Coburn.

Dr. H. H. TYSON presented a case of **exophthalmic goitre**

with optic nerve atrophy. The patient, a woman aged 35 years, was first seen in 1907. Her present illness began four years ago with the typical symptoms of Basedow's disease, extremely nervous, tremor, tachycardia, swelling of the left side of the neck, and marked protrusion of the left eye. This condition existed six months when the other eye began to protrude and six months later the sight began to be blurred for near use, and later for distance. Vision, O. D. $\frac{20}{30}$ and O. S. $\frac{20}{200}$. The color fields were slightly contracted in the right eye and greatly contracted in the left. There was also a small central scotoma for red. The left disk was swollen, with temporal pallor, arteries and veins dilated. Right disk was hyperæmic and veins slightly dilated. Evidently there was a low-grade optic neuritis. Pupils measured 5*mm* and reacted sluggishly to light. The pulse varied from 138 to 158 and blood pressure was 190*mm*. Base of the neck measured 13 inches, but increased 2 inches at the menstrual period. Auscultation revealed a systolic murmur, and the legs were œdematous. After a time the right disk became pale and the arteries contracted and the walls of the vessels thickened. Treatment consisted of rest, digitalis, Blaud's pills, potassium iodide, and rhubarb and soda mixture. Only four cases of optic nerve atrophy in exophthalmic goitre are recorded in literature, viz.: those of Story, Rieger, Forster, and Emmet. Story's description of his case corresponds in several particulars with the present case. Posey writes that he regards the cases of atrophy in exophthalmic goitre as complications rather than as a symptom of the disease. Ochsner and Thompson state that "œdema may be present in the brain and elsewhere." Holden found in a case of exophthalmos, due to increase in the contents of the orbit but not due to Basedow's disease, that the atrophy was due to pressure. Thorner states that "toxins injure the cells of the Pacchionian bodies and that they can produce œdema of the disk and choked disk independently of intracranial pressure." In view of these facts it seems probable that in severe cases of exophthalmic goitre we have the conditions to produce a low grade of optic neuritis and atrophy: By direct action of the toxins on the nervous elements acting as a direct poison, and indirectly by the lowered resistance of the nerves due to the

toxins, the nerves thus yielding more readily to the effect of pressure. In this case the optic-nerve disease seems to be due to the direct action of the Basedow's disease, and is not a complication, as all the known causes of optic atrophy could be excluded.

In the discussion, Dr. W. B. JOHNSON said that in consideration of the fact that so few cases of atrophy had been reported out of such a large number of cases of exophthalmic goitre he would regard it rather as a complication of Basedow's disease.

Dr. W. M. LESZYNSKY likewise thought it must be due to a complication, but was unable to ascribe a cause. Possibly a very critical examination would reveal it.

Dr. O. SCHIRMER disagreed and said that because a larger number had not been reported it did not follow that it could not occur. It might depend upon the susceptibility of the individual, as in cases of arsenical poisoning, quinin, alcohol, and other substances producing atrophy.

In conclusion, Dr. TYSON said that he based his opinion partially on the history and condition of the patient as well as on a careful examination. All other causes of the optic atrophy could be excluded. If cranial and ocular palsies could be produced by Basedow's disease, he thought it not unreasonable that optic atrophy could also be produced.

Dr. J. H. CLAIBORNE read a report of a case of **gonorrhœal conjunctivitis aborted by the use of 2% silver nitrate solution.** The patient, a man aged 49 years, awoke one morning with his eyes inflamed and stuck together, and by noon a purulent inflammation of intense degree had developed. Examination of the pus by three observers demonstrated the gonococcus, but no source of the contagion could be traced. The patient was immediately put to bed, the eye irrigated with a 1:3000 bichloride solution, and the conjunctival sac filled with a 2% silver nitrate solution and allowed to remain 15 seconds until the mucous membrane had turned white. Atropin was instilled and routine applications of ice were made, and instillation of 1:3000 bichloride solution every 2 hours. The secretion began to diminish and the swelling and œdema of the lids to subside. In the meantime the other eye began to show unmistakable signs of inflammation of a purulent

type. This eye was now treated with the 2% silver nitrate solution, just as the first had been treated, and cold applications were made. The two eyes continued to improve, one eye being somewhat more advanced toward recovery than the other. The patient left the hospital in one week with the eyes only slightly red and without any pain or discharge. Careful investigation showed that treatment was begun in this case within 12 and at most not more than 24 hours after the onset of the disease. The incubation period of gonorrhœal conjunctivitis is unknown. Treatment is usually begun only after the brawny stage has been reached, and the teaching has been that silver nitrate solution should not be applied in the incipient stages but rather during the decline of the disease. In the second eye the treatment was not begun until 10 to 12 hours had elapsed after the first appearance of pus and the diagnosis was certain.

Dr. W. B. JOHNSON did not agree that every case could be aborted, and thought that the results in one case were not sufficient from which to draw broad conclusions as to the value of nitrate of silver solutions in aborting gonorrhœal conjunctivitis.

Dr. H. W. WOOTTON said that as the treatment had been tried on two eyes it might be fairly said to have been tried on two cases.

Dr. CLAIBORNE said that after this experience he was so sure of the efficacy of the 2% silver solution that he had entirely lost his fear of infection from the secretion.

Dr. I. M. HELLER read the **report of three cases of acute glaucoma treated with subconjunctival injections of sodium citrate.** The first case was a woman aged 80 years who had previously had a combined extraction in one eye. The eye was now painful and vision reduced to perception of light, and the fundus invisible. Tension was plus. A broad iridectomy was made and treatment with heat and myotics begun, but without avail. Injection of about 8 minims of a 4½% solution of sodium citrate was made subconjunctivally. The pain was increased for a time, but disappeared in 2 hours, and the patient was now able to sleep without an opiate. The tension was normal at the end of 24 hours and the vision had improved to counting fingers at 6 feet. She was discharged

at the end of 5 days. The second case was an acute one with steamy and anæsthetic cornea, great pain, and tension +3. Vision was limited to forms at 2 feet. An injection of the sodium citrate was made, which was followed as before by increase of pain and smarting for about 2 hours. The next day vision had improved, she had only a slight headache and tension was much lower. The improvement continued, and the patient was discharged cured at the end of 11 days. The third case was also a case of acute glaucoma and vision was reduced to fingers at 4 feet. Under the routine treatment she made no improvement, and then an injection of the sodium citrate was made. The pain of injection subsided in 2 hours, and no opiates were again required. Four days later it was thought that there was a slight increase in the tension, which had become entirely normal after the first injection, and a second was made. At the end of a week, an examination showed that she could count fingers at 20 feet and all signs of the disease had disappeared. Thomas and Fisher, the authors of this method of treatment, hold that glaucoma is an œdema of the eye and is due to an increased affinity of the tissue colloids for water. Sodium citrate was selected because it counteracts this affinity of the tissues for water and because it does not cause corneal opacities. The only noticeable effect of the injection was to cause a slight ecchymosis in one case which quickly disappeared. This method of treatment has the advantage of being simple and easily administered and even if the disease is not cured it relieves the excruciating pain of acute glaucoma in 2 or 3 hours.

In the discussion, Dr. C. W. CUTLER said that he had tried this method on one case but the only result was to diminish the tension.

Dr. O. SCHIRMER read a paper entitled **Optic nerve affections due to poisoning with organic and inorganic arsenical preparations.**

This paper will be published in full in a later number.

Dr. A. E. DAVIS said that if the dosage was small, as used by the French physicians, he thought there would be no bad effects.

Dr. J. H. CLAIBORNE inquired as to the effects of arsenic eating by the Styrians.

In conclusion Dr. SCHIRMER said that one of his cases had been treated with small doses and yet with bad results. He had seen no cases of blindness reported as occurring among the Styrians.

Dr. G. H. BELL presented a case of **keratoconus** for Dr. W. B. MARPLE.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE FIRST AND SECOND QUARTERS OF THE YEAR 1909.

By Dr. G. ABELSDORFF, in Berlin; Prof. ST. BERNHEIMER, in Innsbruck; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Dr. R. SCHWEIGGER, in Berlin; with the assistance of Prof. A. ALLING, New Haven; Prof. E. BERGER, Paris; Prof. CIRINCIONE, Genoa; Dr. DALÉN, Stockholm; Prof. HIRSCHMANN, Charcow; Dr. J. JITTA, Amsterdam; Mr. C. DEVEREUX MARSHALL, London; Dr. H. MEYER, Brandenburg; Dr. P. VON MITTELSTÄDT, Metz; Dr. H. SCHULZ, Berlin; Prof. DA GAMA PINTO, Lisbon; and others.

Translated by Dr. MATTHIAS LANCKTON FOSTER.

(*Continued from page 320.*)

Sections XIII.–XVIII. Reviewed by Dr. NICOLAI, Berlin.

XIII.—LENS.

110. CONNOR, L. **Conditions under which the striæ of incipient senile cataract appear and disappear.** *Ophthalmic Record*, Jan., 1909.

111. GIFFORD, H. **Two cases of Vossius' ring-shaped opacity of the lens.** *Ophthalmology*, Jan., 1909.

112. KOENIGSHOEFER. **The specific treatment of incipient senile cataract.** *Ophthalm. Klinik*, 1908, Nos. 18 and 19.

113. TERRIEN, E. **Cataract from electric shock.** *Société d'ophtalm. de Paris*, Nov. 3, 1908.

CONNOR (110, **Conditions under which the striæ of incipient senile cataract appear and disappear**) believes that the failure of the capsular cells to nourish the lens fibres sufficiently to fill up the gaps produced by the shrinkage of the cells about the lens nucleus is the cause of cataract. This local defect in the trophic condition of the cell is usually induced by

malnutrition and faulty living as well as by defects in the eyes themselves. That it is possible for recent striations in the lens to disappear he proves by the relation of cases. Treatment should be directed toward the unhealthy bodily conditions and the refraction corrected, together with local treatment of the eyes. ALLING.

The opacity described by Vossius is in the anterior capsule and can be seen only with dilated pupil. It is composed of minute dots sometimes of brown color and was supposed to be due to the pressure of the iris against the lens as the latter lies against the cornea after contusions of the eye. It disappears in all cases in a month.

GIFFORD (111, **Two cases of Vossius' ring-shaped opacity of the lens**) believes that the opacities are behind the capsule. ALLING.

KOENIGSHOEFER (112, **The specific treatment of incipient senile cataract**) gave a powder made from animal lenses to patients with incipient cataract but obtained no positive result although the treatment was long continued.

TERRIEN (113, **Cataract from electric shock**) reports a case in which a man 26 years old received a current of 500 volts. Two months later a cataract formed in one of his eyes. Three similar cases have been reported. Terrien thinks that a mechanical and an electrolytic effect were produced simultaneously upon the lens which caused a change in the epithelium of the capsule and resulted in the formation of the cataract.

XIV.—IRIS.

114. WAVER, J. S. **Cyst of the iris.** *Ophthalmic Record*, Feb., 1909.

115. ZIEGLER, I. L. **History of iridotomy.** *Jour. Amer. Med. Assoc.*, Feb. 13, 1909.

116. OGUCHI, CH. **Traumatic detachment and displacement of the ciliary body with the root of the iris forming a coloboma of the iris.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., i., 6, p. 616.

WAVER (114, **Cyst of the iris**) saw a translucent gray tumor with streaks ot brown iris pigment on its surface lying on the iris on the temporal side of the pupil. It was 7 by 4*mm* in size. There was no history of traumatism. Operation was declined and when seen last it was unchanged except in being somewhat larger. ALLING.

After an historical review of the methods of forming an artificial pupil, ZIEGLER (115, **History of iridotomy**) explains his own method, which consists in making a V-shaped incision through the membrane by means of two cuts with a knife needle which converge to a point. The tongue-like flap usually rolls back. ALLING.

OGUCHI (116, **Traumatic detachment and displacement of the ciliary body with root of the iris forming a coloboma of the iris**) describes a case in which the iris in the lower part appeared to be absent after a kick from a horse. The eye was enucleated. The ciliary body together with the root of the iris was detached and displaced backward so that the iris was behind the sclera. There were ruptures and hemorrhages of the retina and choroid. The blow had struck the lower wall of the orbit.

XV.—CHOROID

117. BOTTERI, A. **Contribution to the pathology of miliary tuberculosis of the choroid.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., i., p. 490.

BOTTERI (117, **Contribution to the pathology of miliary tuberculosis of the choroid**) has demonstrated for the first time tubercle bacilli intravascularly and has thereby furnished a basis for the explanation of the origin of tuberculous nodules in the choroid. The bacilli are carried in the blood current into the choroid and settle in the predisposed tissue.

XVI.—VITREOUS.

118. STRAUB, M. **The pathology of the vitreous.** *Sitzungsbericht Niederl. Ophthalm. Gesellsch. Nederl. Tijdschr. v. Geneesk.*, 1909, No. 5.

119. GEHRUNG, J. A. **Hemorrhage into the vitreous body in the adolescent.** *New York Medical Journal*, Dec. 9, 1908.

STRAUB (118, **The pathology of the vitreous**) demonstrated the pathological changes of the vitreous in primary and secondary hyalitis. He described the formation of spaces and the collapse of the vitreous, the segmentation of leucocytes, the new formation of connective tissue and blood-vessels and the cyclitic membranes. VISSER.

GEHRUNG (119, **Hemorrhage into the vitreous body in the**

adolescent) points out the dangerous character of these cases and believes that the causes are mainly as follows: Too rapid development, exposure to sudden temperature changes, menstrual disturbances, cardiac disease, malnutrition, hereditary tendencies towards vascular disease, and sudden fluctuations in blood pressure. The hemorrhage may be from the retinal vessels and from vessels in the region of the ciliary body. The age following puberty is the danger period. ALLING.

XVII.—GLAUCOMA.

120. MARSHALL, C. D. **An unusual case of glaucoma.** *Ophthalmoscope*, April, 1909.

121. THOMPSON, HUGH. **Primary glaucoma in young patients.** *Ophthalmic Review*, June, 1909.

122. RINNE, H. **A new peculiarity of the visual field in glaucoma.** *Hospitalstid.*, 1908, p. 1441.

123. VALUDE, E. **Irido-sclerectomy.** *Annales d'oculistique*, cxxxix., p. 346.

124. LINDENMEYER. **Posterior sclerotomy in malignant glaucoma.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., i., 3, p. 275.

125. MENDEL, FRITZ. **Severe glaucoma from traumatic dislocation of the lens, cured by operation.** *Centralbl. f. Augenheilk.*, xxxiii., 1, p. 5.

MARSHALL (120, **An unusual case of glaucoma**). A youth of 21 years had noticed his sight failing for ten months. When first seen by an oculist his left eye was found to be blind. The right fundus showed well-marked cupping, which, however, was not marginal. There were numerous punctate hemorrhages scattered all over the retina. V corrected=$\frac{6}{12}$. The left disk showed a cup of 9 D, also not peripheral. There were numerous retinal hemorrhages. T+1. V=hand reflex. Blood examination gave—red cells, 5,720,000; white, 5092. Hæmoglobin 90%. Coagulation time prolonged from 9 to 13 minutes. Virtually the blood was normal. An iridectomy was performed on the better eye. The vision improved to $\frac{6}{9}$. This was so successful that iridectomy was done on the left eye. No improvement in vision resulted, but the tension fell to normal.

T. HARRISON BUTLER.

THOMPSON (121, **Primary glaucoma in young patients**) records 5 cases of glaucoma simplex in young adults, the young-

est 15, the oldest 33. In none of them was the anterior chamber shallow, and in one the chambers were unusually deep. The disease generally ran a chronic course. In four cases the disk became cupped. The effect of operative treatment was good. Devereux Marshall, *Ophthalmoscope*, April, 1909, records a similar case (abstracted in this Journal).

T. HARRISON BUTLER.

RINNE (122, **A new peculiarity of the visual field in glaucoma**) found in 11 cases of glaucoma within six months that the approximately vertical nasal border of the visual field suddenly moved a distance along the horizontal meridian toward the periphery. This "nasal spring," which seems to be a common peculiarity of the visual field of glaucoma, must be due to the fact that the nerve fibres which supply the nasal upper quadrant of the visual field and lie at the lower margin of the papilla are not affected to the same degree as those that supply the lower nasal quadrant and lie at the upper margin of the papilla. This symptom corresponds with the curved glaucomatous defects of the visual field described by Bjerrum and confirms his theory that the topographical relation of the visual field furnishes a picture of the radiation of the nerve fibres from the papilla. The cause of the defect in the visual field is, in Rinne's opinion, a distortion of the nerve fibres. HELLGREN.

VALUDE (123, **Irido-sclerectomy**) reports two cases of glaucoma on which he performed Lagrange's operation of irido-sclerectomy. In one a hemorrhage into the vitreous and a slight loss of the latter occurred during the operation. In spite of a free sclerotomy only a transient reduction of the intraocular tension was produced. In the other case the final result was very good. BERGER.

LINDENMEYER (124, **Posterior sclerotomy in malignant glaucoma**) made a posterior sclerotomy a few days after the iridectomy in a case of malignant glaucoma. Healing followed after the restoration of the anterior chamber with a cystoid cicatrix. The vision improved immediately and permanently. In these cases it is necessary not to wait long, but to perform the operation after the iridectomy wound has agglutinated.

In MENDEL'S (125, **Severe glaucoma from traumatic dislo-**

cation of the lens, cured by operation) case the luxated lens was removed from the anterior chamber because of the great increase of tension; after recovery the vision was $\frac{5}{10}$ and there was no more trouble.

XVIII.—SYMPATHETIC OPHTHALMIA.

126. PECHIN. **Sympathetic atrophy of the optic nerve.** *Soc. française d'ophtalm.*, May, 1909.

127. GAUTRELET, J. **The reaction of adrenalin in lesions of the ocular sympathetic.** *Archives d'ophtalmologie*, xxix., p. 222.

128. BUTLER, T. H. **A case of sympathetic cyclitis which completely recovered.** *Ophthalmology*, April, 1909.

In two cases PECHIN (126, **Sympathetic atrophy of the optic nerve**) saw optic atrophy of the other eye follow an accidental injury and is inclined to ascribe it to a sympathetic disease.

GAUTRELET (127, **The reaction of adrenalin in lesions of the ocular sympathetic**) recommends for the differential diagnosis between paralytic and spastic myosis the instillation of adrenalin into the conjunctival sac. Although in the normal eye adrenalin causes no change in the pupil it causes mydriasis in the case of paralytic myosis as shown in a case of paralysis of the sympathetic.

The case described by BUTLER (128, **A case of sympathetic cyclitis which completely recovered**) received a perforating wound of the cornea and lens which was followed by iridocyclitis. Seven weeks later the other eye showed sympathetic irritation and the offending eye was enucleated. A week later a sympathetic cyclitis commenced and vision was reduced to fingers. A year's treatment with mercury brought about recovery. No foreign body was found in the injured eye. ALLING.

Sections XIX.-XXI. Reviewed by DR. MEYER, Brandenburg.

XIX.—RETINA AND FUNCTIONAL DISTURBANCES.

129. AXENFELD. **Remarks concerning retinitis pigmentosa, particularly without hemeralopia.** *Klin. Monatsbl. f. Augenh.*, xlvii., i., Supplement, p. 53.

130. KRAUSS, W. **Casuistics of the ring scotoma in retinitis pigmentosa.** *Zeitschrift f. Augenheilkunde*, xxi., 1., p. 48.

131. BUTLER, T. HARRISON. **Excavation of the macula, with some**

cases showing its association with atrophy of the macula bundle. *Ophthalmoscope*, Jan., 1909.

132. GRIMSDALE, H. B. **A case of recurrent retinal hemorrhage in a boy of 18 years, the result of (?) malignant endocarditis.** *Ophthalmoscope*, March, 1909.

AXENFELD (129, **Remarks concerning retinitis pigmentosa, particularly without hemeralopia**) reports another case of typical pigment degeneration with large ring scotoma but without the usually early symptom of hemeralopia, and has collated the literature concerning such cases. He agrees with Gonin that usually in retinitis pigmentosa a ring scotoma is to be observed, which extends outward, contrary to the contraction of the field. Contrary to the views of Wagenmann, Gonin, and Buerstenbinder that retinitis pigmentosa is caused by obliterating processes in the vessels of the choroid, he says that it is due to cytotoxic substances brought through the choroidal vessels which cause no vascular change, but injure the function of the pigment epithelia, as has been sufficiently shown in idiopathic hemeralopia. Therapeutically the author recommends gray protective glasses in order to avoid sudden changes of light and to keep the retina in a high degree of adaptation.

KRAUSS' (130, **Casuistics of the ring scotoma in retinitis pigmentosa**) case was one of a patient 67 years old who had typical retinitis pigmentosa, a relative central scotoma surrounded by an absolute ring scotoma and an intact peripheral field of vision. When the light was reduced the ring scotoma extended farther toward the periphery. The early symptom of pigment atrophy, the hemeralopia, was absent in the peripheral parts.

BUTLER (131, **Excavation of the macula, with some cases showing its association with atrophy of the macula bundle**). Only one of the author's six examples of macular disease shows a typical hole as first described by Noyes, the others are more crateriform. The paper shows how by reason of its anatomical structure the macula is a weak spot in the retina, and is therefore more liable to destruction by traumatism or disease than the surrounding retina.

In three of the eyes illustrated the macular disease was associated with well marked atrophy of the temporal sector

of the disk. This is not surprising for it has been shown by Fuchs, Coats, and others that the ganglion layer of the retina is destroyed in macula holes, and the macula bundle contains afferent fibres only which are the axons of these ganglia. Since the paper was published islets of choroidal exudate very like tubercles in appearance have developed round the macula of the second eye in Case 2. The vision fell from normal to $\frac{5}{10}$. The patient did not react to two injections of tuberculin, but after these injections the macular disease ceased to develop and vision rapidly improved. Treatment with T. R. was commenced, and at the present time vision has returned to 5, and the deposits are clearing up. Under the circumstances it appears probable that the condition shown in Fig. 3 was due to a tuberculous process limited to the macula. T. HARRISON BUTLER.

GRIMSDALE (132, **A case of recurrent retinal hemorrhage in a boy of 18 years, the result of (?) malignant endocarditis).** Recurrent hemorrhages appeared in the macular region of the eyes of a boy of 18. The hemorrhage was accompanied by a patch of œdema, which became organized. The coagulation time of the blood was lengthened, so calcium lactate was administered. The small hemorrhages recurred at intervals, and scotomata were detected. Macular figures were present for some time.

As the œdema cleared up, superficial atrophy of the retina and chorio-capillaris became visible in the macular region. Vision improved to . The hemorrhages were first seen in 1905. Late in Sept., 1906, he was last seen by Grimsdale and in May, 1908, he died of a septic condition which appeared to be malignant endocarditis. A beautifully executed plate accompanies the paper.

T. HARRISON BUTLER.

XX.—OPTIC NERVE.

133. ROBINSON, GEORGE. **Decompression in choked disk.** *Ophthalmology*, Jan., 1909.

134. BORDLEY, J., and CUSHING, H. **Observations on choked disk, with especial reference to decompressive cranial operations.** *Jour. Amer. Med. Assoc.*, Jan. 30, 1909.

135. CUSHING, HARVEY, and BORDLEY, JAMES. **Observations on experimentally induced choked disk.** *Bulletin Johns Hopkins Hosp.*, April, 1909.

136. PATON, LESLIE. **Optic neuritis in cerebral tumors.** *Ophthalmoscope*, March, 1909.

137. OGUCHI, CH. **Anatomy of the congenital pigmentation of the optic nerve.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., i., 6, p. 616.

138. FEHR. **Pigmentation of the optic nerve.** *Centralbl. f. Augenheilk.*, xxxiii., p. 65.

139. LAUBER, H. **Clinical and anatomical studies of hole-shaped partial coloboma of the optic nerve.** *Zeitschrift f. Augenh.*, xxi., 5, p. 494.

140. YAMAGUCHI, H. **Central scotoma in beriberi.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., i., 6, p. 517.

141. STEPHENSON, SYDNEY. **Crateriform hole in the optic disk.** *Ophthalmoscope*, Feb., 1909.

ROBINSON (133, **Decompression in choked disk**) adds his testimony to the wisdom of early operation in these cases, for the purpose of saving the patient's vision even though there may be an inoperable malignant tumor within the brain. The case reported by him showed the classical symptoms of tumor of the cerebellum. At the operation there was bulging of the dura on the right side. No tumor was found although the cerebellum was apparently not fully explored. After a month the patient was discharged with a decided improvement in vision. ALLING.

BORDLEY and CUSHING (134, **Observations on choked disk, with especial reference to decompressive cranial operations**) base their conclusions on about 200 cases of brain tumor as well as an equally large number of examples of nerve involvement in various diseased conditions. After a summary of the theories of the causation of choked disk they state their conviction (arrived at principally through observations of the effects of the decompression operation) that the cause is mechanical, *i.e.*, a distension of the optic nerve sheath with cerebro-spinal fluid. They further believe that the papillitis found, for example, in meningitis and nephritis is but a modified form of choked disk and a symptom of cerebral pressure and œdema. It is well known that tumor cases will show typical stellate figures at the macula which are so characteristic of albuminuric retinitis. They find nothing in the eye ground that is of value in determining the size or structure of a cerebral tumor nor its duration but there is a decided proportion of cases which show an earlier or more marked involvement of the eye corresponding to the side of the lesion

in the brain. This is especially true of those tumors which do not cause general hydrocephalus as those in the temporal lobe or near the insula. The paper is a plea for early decompression operation not only in brain tumor but in a number of other conditions. The sub-temporal site meets most fully all the requirements. The general rule that vision is ultimately lost in these cases and that there is practically always an improvement after operation makes this advice sound. ALLING.

CUSHING and BORDLEY (135, **Observations on experimentally induced choked disk**) have already published their conviction that choked disk has a mechanical cause, basing this belief on clinical observations such as those in cases of brain trauma with increased intracranial pressure, and on the similarity between fundus changes in cases of brain tumor and nephritis which points toward similar origin for both, namely pressure resulting in cerebral œdema. Further there are many observations on the beneficial effect of the decompression operation on choked disk. They now present results of experiments on animals by which the intracranial pressure was increased and it is apparent that a neuro-retinal œdema with marked elevations of the disk may accompany conditions which give rise to increased intracranial pressure, whether from the introduction of new fluid or transmission of tension to fluid already present. In connection with these fundus changes there is a visible distension of the optic nerve sheath. Further experiments to produce venous stasis seem to show that nothing more than engorgement of the retinal veins resulted and not œdema. Finally they introduced within the brain cavity sponge tents to simulate a tumor and found that without the association of any toxic agent or inflammation eye lesions resembling the early stages of choked disk could be produced. ALLING.

PATON (136, **Optic neuritis in cerebral tumors**). The author describes the appearances seen in various degrees of neuritis. He does not look upon hemorrhages as an indication of a severe neuritis, but macular figures have this significance. These occur in 15% of examples of optic neuritis due to cerebral tumor. The average swelling of all cases is 4.5 D, but in cases with a macular figure it is 5.1.

UofM

The figure is an expression of an overflow of œdema, mainly in the nerve fibre layer. They are usually fan-shaped, the points reach nearly to the macula, and the spokes number 8 to 20. The macular fan is elevated above the surface of the retina. They are more frequent in cerebellar tumors.

80% of all cerebral tumors cause optic neuritis. All cases of cerebellar tumor get neuritis; all examples of temporo-spheroidal tumor get it; and practically all ventricular tumors and tumors of the optic thalamus and mid-brain. The great bulk of the cases which do not get optic neuritis are pontine and subcortical tumors—tumors of the white matter of the cerebral hemispheres. The nature of the tumor itself has no influence in determining the incidence of the neuritis. Paton does not believe that it is possible to say that a tumor is on the same side of the brain as that eye which shows the most intense neuritis. His analysis of over 100 cases lends considerable support to his contention, which however is most strongly opposed by Sir Victor Horsley and others (see *Trans. Ophthalmological Soc. U. K.*, vol. xxviii., 1908). The time to decompress to save vision is not when the neuritis first appears, but when the first signs of visual failure manifest themselves.

T. Harrison Butler.

Oguchi (137, **Anatomy of the congenital pigmentation of the optic nerve**) had the opportunity to examine microscopically an eyeball in which a spot of pigment had been observed at the entrance of the optic nerve. The pigment was amorphous and granular. The septa in the region of the pigment spot were permeated with elastic fibres. He thinks the deposit of pigment was congenital and either a hypertrophy of the pigment cells, frequently found histologically in this situation, or a broken off germinal mass.

Fehr (138, **Pigmentation of the optic nerve**) reports a case in which the optic nerve was torn by traumatism. It is of special interest because the gradual pigmentation was observed. Most authors think the pigmentation to be of hæmatogenous origin, which is denied by Knapp for his case because of the faulty communication between the optic sheath and the nerve head. In this case the hæmatogenous origin of the pigment cannot be directly denied, but Fehr

Yale

considers it possible that the pigmentation was due to immigration of pigment from the retina and choroid.

LAUBER (139, **Clinical and anatomical studies of hole-shaped partial coloboma of the optic nerve**) has studied five cases of this nature clinically, one of them pathologically. He concludes that the circumscribing gray spots in the optic papilla mark the partial colobomata; their color is due to contrast and shadows, not to pigmentation; they are sometimes associated with a conus below and are nearly related to this malformation; they cause a paracentral scotoma and coincidently or independently a peripheral contraction of the field.

YAMAGUCHI (140, **Central scotoma in beriberi**) describes a case of beriberi with disease of the optic nerve, evidenced by a central scotoma for color, which closely resembles a case of tobacco intoxication. Yamaguchi favors the theory that beriberi is due to an intoxication rather than to a specific exciting agent.

STEPHENSON (141, **Crateriform hole in the optic disk**). The example of this rare condition is described and illustrated by a splendid painting. T. HARRISON BUTLER.

XXI.—INJURIES, FOREIGN BODIES, PARASITES.

142. AYRES, S. C. **Lightning burn of the eye.** *Amer. Jour. of Ophthal.*, April, 1909.

143. v. MICHEL. **The anatomical changes giving rise to the ophthalmoscopic picture of an occlusion of the central artery of the retina in consequence of a direct injury of the orbit.** *Zeitsch. f. Augenheilkunde*, xxi., 2, p. 116.

144. WHARTON, J. **The extraction of particles of metal from the interior of the eye.** *Ophthalmoscope*, May, 1909.

145. JACKSON, EDW. **Scissors magnet extraction of iron from the eyeball.** *Jour. Amer. Med. Assoc.*, June 19, 1909.

146. GUENTHER, JOH. **Injuries of the eye by small shot from a clinical and a pathological standpoint.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., 1, Supplement, p. 167.

A few hours after his patient had suffered from a shock from close proximity to a lightning bolt AYRES (142, **Lightning burn of the eye**) found the eyelids red, swollen, and œdematous and the upper half of the cornea hazy from what seemed to have been œdema. The eyes remained painful for several days but recovery was complete. ALLING.

v. MICHEL (143, **The anatomical changes giving rise to the ophthalmoscopic picture of an occlusion of the central artery of the retina in consequence of a direct injury of the orbit**) reports a case of injury to the orbit in which the ophthalmoscopic picture was presented of an occlusion of the central artery of the retina. The patient died of tetanus. Microscopical examination revealed a double occlusion of the central artery of the retina, one from laceration of the vessel wall and the consequent rolling in of the elastica and media, the other from the formation of a hyaline-appearing thrombus situated centrally from the tear which completely filled the lumen.

WHARTON (144, **The extraction of particles of metal from the interior of the eye**) reviews the results which he has obtained in 50 consecutive operations upon patients at the Royal Eye Hospital at Manchester. The magnets used were Haab's giant magnet and Hirschberg's hand magnet. 66% of the eyes were saved. In 37 eyes the wound was in the cornea, in 10 it was in the ciliary region, in 3 in the sclera. In all cases when the piece of metal entering by the cornea had come to rest anterior to the suspensory ligament or the posterior capsule of the lens the eye was saved, the ultimate vision being, $\frac{6}{6}$ in 7 cases, $\frac{6}{9}$ in 2, and $\frac{6}{12}$ in 3. Two of these cases already had hypopyon at the time of the operation. When the metal had penetrated to the vitreous the case was more serious. Of 25 only 14 were saved, and only 6 had $\frac{6}{12}$ vision or more. Wounds in the ciliary region caused loss of vision in half the cases from septic infection. Detached retina was observed in 5 eyes; in all these cases the giant magnet had been used. The methods employed were the usual ones. Wharton generally found that an iridectomy was necessary when the metal had to be drawn through the circumlental space.

T. HARRISON BUTLER.

JACKSON (145, **Scissors magnet extraction of iron from the eyeball**) describes two cases of magnetizable foreign body in the eye which could not be brought out with the hand or giant magnet. After localizing with the X-ray the sclera was incised in the proper place and a scissors curved on the flat was introduced. The blunt end of the magnet was brought in contact with the joint of the scissors so as not to

interfere with the cutting movements. By snipping the foreign body was freed from strands of tissue and drawn out on the scissors. In both cases good vision was restored.

ALLING.

GUENTHER (146, **Injuries of the eye by small shot from a clinical and a pathological standpoint**) presents the results in 32 eyes injured by small shot in 30 patients. Of 12 eyes with double perforation none retained useful vision. Enucleation had to be performed in 9 of the 17 cases in which the injury was not perforating, and even among the remaining 8 not one recovered with vision at all satisfactory. Although the glancing shot does not in general cause serious disturbances, yet the author recommends enucleation as soon as possible on account of the unfavorable prognosis as regards vision together with the coincident danger of sympathetic inflammation. Experimental studies show that lead is borne with comparatively well in the anterior chamber, but very badly in the vitreous. Double perforations give a somewhat better result, though here also marked cyclitic changes may appear. The symptoms are due to a more chronic form of inflammation which is partially explained by the detachment of the retina and the cicatricial contraction acting as a constant irritant.

XXII.—OCULAR LESIONS IN GENERAL DISEASES.

PUPILS.

Reviewed by DR. HUEMMELSHEIM, Bonn.

147. SEEFELDER. **Pathology of the hyaline degeneration of the margin of the pupil.** *Zeitschrift. f. Augenheilkunde*, xxi., 4, p. 289.

148. LAAS. **Contraction of a pupil immovable to light by the sprinkling of dionin in the other eye.** *Deutsche med. Wochensch.*, 1909, No. 17.

149. GINSBERG, S., and DESSAUER, PAUL. **Meningitis cerebrospinalis acuta purulenta (epidemica?) with hemianopsia and hemianopic reaction of the pupils.** *Centralbl. f. prakt. Augenheilk.*, xxxiii., 2, p. 34.

150. ROENNE, HENNING. **Tonic accommodation reaction of pupils immovable to light.** *Klin. Monatsbl. f. Augenheilkunde*, xlvii., ii., 1, p. 41.

151. WESTPHAL, A. **Further observations concerning pupillary phenomena observed in katatonic stupor, together with an attempt to explain the katatonic pupillary rigidity.** *Deutsche med. Wochensch.*, 1909, No. 23.

152. NAPP. **Family unilateral absolute immobility of the pupil.** *Ber. ueber die Berliner ophthalm. Gesellsch.*, April 17, 1909.

SEEFELDER (147, **Pathology of the hyaline degeneration of the margin of the pupil**) examined microscopically a case of the so-called hyaline degeneration of the margin of the pupil and found the primary cause to be a sclerosis of the vessels and an associated proliferation and sclerosis of the perivascular connective tissue.

LAAS (148, **Contraction of a pupil immovable to light by the sprinkling of dionin in the other eye**) repeatedly observed in a boy suffering from hereditary syphilis that his moderately dilated left pupil, which was immovable to light, contracted to the maximum, remained contracted some minutes, and then convulsively dilated again when he sprinkled dionin into the right eye, which induced a sharp closure of the lids. He believes that other excitants that cause such a unilateral reflex spasm of the lid have a like action on the other eye and that this procedure should be employed in the study of the lid reaction in the psychically diseased.

GINSBERG and DESSAUER (149, **Meningitis cerebrospinalis acuta purulenta (epidemica?) with hemianopsia and hemianopic reaction of the pupils**) found in a case that had recovered for about seven weeks from a mild attack of acute purulent cerebrospinal meningitis total atrophy of the right and partial of the left papilla with homonymous hemianopsia to the left and a large central defect for the right eye. A distinct hemianopic pupillary reaction could be obtained by gaslight and with the plane mirror. This remained unchanged for four weeks, but then appeared only at times and indistinctly. Three weeks later every sign of a hemianopic reaction of the pupil had disappeared. The pupils reacted only to central irradiation, a condition that has remained without change up to the present time, a year and a half after the commencement of the disease. The scotoma of the right eye disappeared, the vision gradually improved, the convergence reaction was always normal.

ROENNE (150, **Tonic accommodation reaction of pupils immovable to light**) reports a case of myotonic reaction of the right pupil of a girl 19 years old who had had ophthalmoplegia interna following measles for 5½ years. The convergence reaction of the oval pupil, immovable to light, required 5 seconds; after cessation of the convergence the pupil re-

mained without change for 10 seconds and then gradually dilated for 30 to 45 seconds. The lid closure reaction was likewise slow. The accommodation was slow and passed off more slowly than normal, yet more rapidly than the pupillary reaction. The condition of the nervous system was normal except for quick reflexes of the lower extremities. A review of the cases of myotonic pupillary reaction hitherto described convinces the author that all transition stages between reflex pupillary rigidity and ophthalmoplegia interna are to be met with, the former in elderly individuals, the latter before the age of 30.

WESTPHAL (151, **Further observations concerning pupillary phenomena observed in katatonic stupor, together with an attempt to explain the katatonic pupillary rigidity**) reports the case of a stuporous katatotic female patient whose eyes were almost constantly fixed in extreme convergence. The very miotic pupils showed sometimes a very slight light reaction. When the convergence relaxed at times the pupils dilated somewhat and reacted a little. The eyeball made convulsive movements now and then, the lids fluttered. Atropin dilated the pupil ad maximum, showing the miosis to be spastic. In a series of other cases it was shown that the pupils irresponsive to light did not contract even with extreme convergence; in such cases the immobility is to be considered absolute. Changes of the form of the pupil are frequent, but not the rule in katatonic immobility. In one case he found a neurotonic pupil reaction. Katatonic immobility has a conditional diagnostic importance. Its most probable explanation is that an abnormal tonus of the iris muscles is present which is intimately connected with changes in the tonus of the body muscles. The possibility of producing pupillary immobility by voluntary muscle tension in hysteria and epilepsy favors this explanation.

NAPP (152, **Family unilateral absolute immobility of the pupil**) exhibited two sisters with congenital mydriasis and absolute immobility of the pupil, one of the right, the other of the left eye. Eserin produced normal contraction. Accommodation was normal. No hereditary syphilis was present.

Reviewed by CLAUSEN, Berlin

153. CLOTHIER, J. V. **Neuro-retinitis due to typhoid fever.** *New York Medical Journal*, April 10, 1909.

154. CALDERARO. **Clinical, anatomical, and experimental studies concerning lepra nodosa of the eyeball and its adnexa.** *La Clinica oculistica*, Feb., 1909.

155. JACKSON, EDW. **Ocular and orbital symptoms of thrombosis of the cavernous sinus.** *Ophthalmology*, Jan., 1909.

156. COSMETTATOS, G. F. **Bilateral metastatic ophthalmia in the course of an attack of epidemic cerebrospinal meningitis.** *Annales d'oculistique*, cxl., p. 276.

157. SELENKOWSKY, J. W. **Changes in the retina in infectious diseases of the anterior segment of the eye.** *Russk. Wratsch.*, 1909, No. 5.

158. MAKLAKOW, A. A. **Changes in the eye in leucæmia.** *Medic. Obosren.*, 1909, No. 5.

159. DAGILAISKY, W. A. **Ophthalmia hepatica and Banti's disease.** *Westn. Ophth.*, 1908, No. 5.

160. DAVIS, T. S. **Malarial blindness, with a report of six cases.** *New Orleans Med. and Surg. Jour.*, Jan., 1909.

161. LERI, ANDRÉ. **The importance of meningitis in the pathogeny of optic neuritis and atrophy.** *Soc. d'ophtalm. de Paris*, Nov. 2, 1909.

162. CHAVERNAC, P. **Double optic neuritis following varicella.** *Annales d'oculistique*, cxl., p. 52.

163. VERDERAME. **Isolated tuberculosis of the papilla.** *Annali di ottalmologia*, 1908, pp. 491-512.

164. OTSCHAPOWSKI. **Eye affections in cranial deformities.** *Westn. Ophthalm.*, 1909, No. 10.

165. RODIET, A. PANSIER, P., and CANS, F. **The ocular manifestations of epilepsy.** *Annales d'oculistique*, cxl., p. 241.

166. LEWITZKY, ST. W. **A case of will paralysis of the conjugate movements of the eye.** *Westn. Ophthalm.*, 1909, No. 9.

167. KNAPE, E. **Choked disk and its pathogenesis.** *Finska Laekar. Handl.*, 1908, ii., p. 100.

168. VINCENT, C. **Thalamic syndrome with hemianopsia, cerebellar troubles, and vaso-asymmetry.** *Soc. de Neurol. de Paris*, June 4, 1909.

169. CHANCE, BURTON. **Herpes zoster ophthalmicus with involvement of the cornea and oculomotor paralysis.** *Annals of Ophthalm.*, April, 1909.

170. POSEY, W. C. **Report of a case of keratitis probably due to metastatic gonorrhœa.** *Ophthalmic Record*, May, 1909.

At the end of the second week CLOTHIER'S (153, **Neuro-retinitis due to typhoid fever**) patient was attacked with neuro-retinitis and the vision dropped to distinguishing form only. Repeated urine analyses showed no albumen and only

slight trace of indican. The vision improved to about ½ after the subsidence of the fever. ALLING.

CALDERARO (154, **Clinical, anatomical, and experimental studies concerning lepra nodosa of the eyeball and its adnexa**) has sought to establish in what way the membranes of the eyeball are invaded by the lepra bacillus because upon this knowledge depends prophylaxis as well as treatment when the eye has already been invaded. His material for study consisted of ten patients with leprosy who had affections in both eyes. Autopsy was performed on one, two others had an eyeball enucleated, while in the others the nodules at the corneo-scleral margin were either extirpated or treated in various ways. The bacteriological examinations showed him that the surface of the back ot the lid seldom contained lepra bacilli, while on the contrary they were very numerous and constant in the margin of the lid. They were not to be found in the tears or lacrymal passages, but were always in the sclero-corneal margin after previous scraping. The aqueous usually contained no bacilli even when lepromata were present in the limbus and in the cornea. The bacilli were always abundant in the mucous membranes of the nose and gums, less so in the interstices of the nails and the handkerchiefs used by the patients, rarely in the blood. Attempts to reproduce leprosy in the eyes of animals gave negative results, even as to theincrease of the bacilli at the place of inoculation. The commencing leprous affections of the lid exhibit histologically a row of groups of cells in the subcutaneous tissue which forms an unbroken chain between the supercilium and the margin of the lid. The starting points of the leprous infiltrations are the hair follicles, the small sweat glands, the little capillary vessels, and the little nerve stems. The first histological sign in the limbus while the eye is still sound is the alteration of the subepithelial and episcleral vascular network. The second sign is the leprous cell infiltration about the vessels and this infiltration with lymphocytes, the leprous character of which is shown by the presence of bacilli, discontinues before it reaches the sclera. In a third period the leprous infiltration appears sparsely in the ciliary body and iris, and quite considerably in the episclera. Finally various foci invade the sclera, while the episcleral focus always

maintains greater proportions. The ciliary body and iris may remain almost sound and without bacilli when the corneo-scleral margin is invaded by large leprous nodules. The author concludes that in the present state of our knowledge it cannot be doubted that the eyeball is invaded by leprosy chiefly by the entrance of the bacilli through the conjunctival and corneal epithelium, although the occurrence of cases of endogenous infection cannot be unconditionally excluded. But such cases must be exceptional, because the bacilli are scarce in human blood and are quickly destroyed by it. For the prophylaxis of the eye in lepra nodosa Calderaro recommends frequent washing of the conjunctival sac with plain, or slightly alkaline, warm water. The eyes should not be touched with fingers or handkerchiefs which are infected with the bacilli. In addition steps should be taken to change the episcleral tissue of the limbus, in which the eye complications of leprosy constantly start, into a compact cicatricial tissue, which is less suited for the entrance and advance of the lepra bacillus. Peritomy with deep cauterization of the episcleral tissue is suited for this purpose.

CALDERARO.

According to JACKSON (155, **Ocular and orbital symptoms of thrombosis of the cavernous sinus**) these symptoms are as follows: Exophthalmos appearing suddenly and increasing progressively, especially if bilateral. Swelling of the orbit, which extends to the whole face. Evidences of venous stasis, such as large tortuous veins, hazy retina, and swollen optic disk. Palsies of both external and internal muscles of the eyeball. Chemosis and inflammation of the conjunctiva and corneal involvement by exposure. ALLING.

COSMETTATOS (156, **Bilateral metastatic ophthalmia in the course of an attack of epidemic cerebrospinal meningitis**) observed in the course of an epidemic of cerebrospinal meningitis in a woman 28 years old the onset of a bilateral metastatic ophthalmia that resulted in blindness of both eyes. Both eyes were affected simultaneously on the seventh or eighth day of the disease. The case is notable on account of the rarity of the bilateral attack of metastatic ophthalmia.

BERGER.

The fact that after an iridectomy for visual purposes in

simple or adherent leucoma the improvement of vision obtained is transitory in many cases in which the media remain clear but the optic nerve shows the picture of white atrophy with frequently distinct atrophy of the retina while the other eye remains perfectly normal induced SELENKOWSKY (157, **Changes in the retina in infectious diseases of the anterior segment of the eye**) to question whether these changes in the nerve and retina did not originate from the same infectious inflammations that caused the leucoma. He used white rabbits for his experiments. If infectious processes in the anterior segment of the eye affect pathologically the retina and optic nerve, the first if not the only cause of this action must be assumed to be the diffusion of the toxins within the eye, and the first step of the investigation must be to determine whether toxins call forth pathological changes in the retina. For this purpose he injected toxin of the staphylococcus aureus into the anterior part of the vitreous of a number of rabbits. In a second series of experiments he injected staphylococcus culture into the anterior chamber, and in a third series he inoculated several places in the cornea with the culture. After intervals of from six days to six months the rabbits were killed under chloroform and the eyes examined microscopically, attention being chiefly directed to the ganglion layer. The results obtained are: 1. In a portion of the cases there was degeneration of the ganglion cells of the retina, more marked in bacterial infection of the anterior chamber, less marked in infection of the cornea. 2. Destruction of Descemet's membrane by the inflammation increases the probability of the harmful effect of the infection upon the retina. 3. The changes in the retina are chiefly caused by the action of the toxins, but sometimes by disturbance of the regular nutrition of the vascular membrane involved in the inflammation and of the retina mechanically detached by exudate. 4. Stationary changes in the retina are found only when the process in the anterior segment of the eye has reached a certain considerable height. 5. The influence of infectious processes in the anterior segment of the eye upon the human retina can be admitted with some probability in cases in which the reduction of the vision is not in unison with the direct results of the infection, namely in

inflammations of the cornea which leave leucomata, and of the iris, of ectogenous and endogenous origin.

HIRSCHMANN.

MAKLAKOW (158, **Changes in the eye in leucæmia**) examined the eye of a patient in whom the diagnosis of leucæmia myelogenes was made clinically four days before her death, and had the opportunity to study one of her eyes microscopically after death. At the first examination he found total detachment of the retina with retinal extravasations. He did not see the changes that have been described as characteristic of leucæmic retinitis. At the autopsy chronic hyperplasia of the spleen, anæmia, and multiple hemorrhages were found. At the microscopic examination he found in addition to the infiltration of the tissues described by others and the retinal hemorrhages a very extensive detachment of the retina caused by a sub-retinal exudate. He found no tears in the vessels, showing that in the retina, as in other organs, the extravasations of blood take place through diapedesis. Retinitis leucæmica is therefore not to be considered as a disease *sui generis*, but as a local expression of the general blood disease. HIRSCHMANN.

DAGILAISKY (159, **Ophthalmia hepatica and Banti's disease**) describes a case, the first to be reported, of pronounced ophthalmia hepatica combined with all the characteristic symptoms of Banti's disease. The patient, a man 20 years old, suffered from hemeralopia and marked xerosis of the conjunctiva over the sclera and in the folds of transition and of the corneæ. The skin of the lids and the sclera were stained yellow, there was a slight œdema of the margins of the lids of both eyes, contraction of the palpebral aperture of the left eye, yellow mucous secretion, the corneæ lustreless, no episcleral injection ot the right eye. In the left eye there was an episcleral and circumcorneal injection, an ulcer of the cornea, surrounded by a small infiltration, a marginal infiltration in the lower periphery, and a slight hypopyon. There were no synechiæ. The pupils dilated well under atropin and rendered possible an ophthalmoscopic examination of the left eye. The papilla was wax colored with dilated veins; the fundus pale and mottled. There were no extravasations and no white spots or points. The tension of

each eye was normal. Vision ot the right eye 0.1; of the left, fingers at 3*m*. There was no xanthopsia. The spleen was of normal form, but greatly enlarged, undulating, nodular. The liver was very large, nodular and hard (hypertrophic cirrhosis). There was great anæmia, no pronounced swelling of the lymphatic glands, repeated severe attacks of epistaxis, and the evening temperature sometimes reached 37.5°. After three months treatment with calomel and Carlsbad salts there was an almost complete recovery of the eye disease, the vision becoming 0.9, with no hemeralopia. The symptoms of Banti's disease were little changed. The writer believes that in this case the Banti's disease was the primary affection, that the cirrhosis of the liver induced the icterus, and that this in turn caused the hepatic ophthalmia.

HIRSCHMANN.

DAVIS (160, **Malarial blindness, with a report of six cases**) finds that blindness due to this cause may be transient and disappear as the fever goes down or may be permanent through atrophy of the nerve. There may be either optic neuritis, retinal hemorrhages, hemorrhage into the vitreous, effusions into the vitreous, or retino-choroiditis. The diagnosis is established by a blood examination and the ophthalmoscope. It is easy to differentiate from quinin blindness by the fact that the latter gives marked ischemia while in malarial affections there is congestion of the papilla. The prognosis is fair. ALLING.

LERI (161, **The importance of meningitis in the pathogeny of optic neuritis and atrophy**) found during the anatomical examination of a case of optic neuritis caused by tuberculous meningitis a wall-like infiltration of lymphocytes in the periphery of the section of the optic nerve from which around cell infiltration extended along the perivascular lymph tracts toward the axis of the optic nerve. Optic atrophy was demonstrable in the peripheral zone of the nerve. Below the chiasm and the optic tract were accumulations of pus cells, though the nerve fibres were involved only in isolated places in the immediate neighborhood. Leri thinks that as regards localization and the way in which the pathological process extends a certain analogy is shown with the optic nerve disease of tabes dorsalis and progressive paralysis. BERGER.

CHAVERNAC (162, **Double optic neuritis following varicella**) reports a case of bilateral optic neuritis which appeared as a sequela of varicella in a boy 11 years old. Under mercurial treatment the vision improved from counting fingers at less than a metre to 0.4 in the right eye and 0.7 in the left. A central scotoma was transiently present. He thinks that in this case the mercury did harm and that better vision would have been obtained if it had not been used. BERGER.

VERDERAME'S (163, **Isolated tuberculosis of the papilla**) patient was a woman 36 years old who had suffered for five weeks with exudative pleuritis of the right side. Before the pleuritis she noticed a little redness of the left eye which became more marked in the course of the disease. The attending physician found complete amaurosis of the eye which became painful and presented symptoms of iritis. The tension was +1 and there was a gray reflex from the fundus. Enucleation was performed because of the severe pain. The globe was placed in Mueller's fluid and examined two years later by the writer. A mushroom-shaped yellowish gray tumor *5mm* high by *6mm* broad was found in the papilla; it protruded into the vitreous and extended back as far as the lamina cribrosa. The composition of the tumor from multiple nodules which were in part confluent, from epithelial and giant cells in the centre and lymphoid cells toward the periphery, and sometimes a central caseation, showed that it was a solitary tubercle of the optic papilla. The presence of tubercle bacilli was also demonstrated in the tissue, although they were in very scanty number. The patient is still living and has no other tuberculous symptoms. The author thinks this a case of primary tuberculosis of the papilla.

CALDERARO.

The forms of eye affections described by OTSCHAPOWSKY (164, **Eye affections in cranial deformities**) in connection with cranial deformities are papillitis, total or partial neuritic optic atrophy, and exophthalmos. The review of the literature shows that the deformations of the skull, usually designated as oxycephalus, do not usually stand in direct causal relation to the eye affections mentioned. Of all types of cranial deformation the synostotic type of skull is at any rate one more accurately definable. In this, through early

closure of the vault of the cranium resulting in distention and broadening of the base, the orbits become flattened and diminished in size, which explains the origin of the exophthalmos, but the etiology of the optic neuritis and atrophy still remains unexplained. The author describes the following case: A boy, 6½ years old, not very intelligent, but in no way idiotic, had had exophthalmos since birth. Until two years before he had had satisfactory vision; at that time he was seized with a violent nosebleed that lasted three days, after which he suddenly became blind. Perception of light persisted for nine months and then the blindness became absolute. He often suffered from headache. Parents, brothers, and sisters were healthy. The skull and face were much deformed. The skull was oxycephalic (cranium hyperbrachycephalicum, cranium hypergypsicephalicum), the eyes were protuberant and not quite covered by the lids, the lower jaw crooked. In the region of the left tuber frontalis was an opening in the bone through which protruded a pulsating meningocele as large as a pigeon's egg. The palate formed a very high arch. The eyeballs protruded forward and downward and could be entirely luxated with ease. There were punctate opacities on the corneæ. There was free mobility and irregular nystagmic movements of the eyes. The pupils were normal and reacted to convergence. Myopia 14 and 13 D. The papillæ were grayish white, enlarged, and with washed out margins. The veins were tortuous and dilated, the arteries inconsiderably contracted. Vision 0. Seven months later a leucoma was present on the right eye and a leucoma adherens on the left, probably in consequence of a keratitis e lagophthalmo. HIRSCHMANN.

RODIET, PANSIER, and CANS (165, **The ocular manifestations of epilepsy**) have examined the eyes of 50 epileptics during and between the attacks. The retinal vessels are contracted at the beginning of an epileptic seizure, dilated during the clonic spasms (venous hyperæmia). Frequently in long continued epilepsy this hyperæmia of the fundus is evident between the attacks. The vision is reduced before the attack and a certain degree of amblyopia is maintained afterward which often induces hallucinations of vision. The more severe the attack the greater is the degree of reduction

of vision. In the intervals between the attacks an irregular peripheral contraction of the field with sector-like contractions was demonstrated. Dyschromatopsia was not met with, though transient complete color blindness may result from an attack. BERGER.

LEWITZKY'S (166, **A case of will paralysis of the conjugate movements of the eye**) patient, a man 44 years old, complained of headache, difficulty in walking, and reduced vision. A month before he had an attack of dizziness, weakness, and darkening of the vision; complete consciousness returned in ½ an hour. Two days later he had headache in the occipital region, vomiting, bad vision, and diplopia. *Status præsens:* anisocoria, the right pupil the larger, very faint reaction of the pupils to light, the eyes commonly directed downward, the margin of the upper lid higher than the upper margin of the cornea. When directed to look to the side he looked forward and converged somewhat, but could look neither to the right nor the left, upward nor downward. When he made an energetic effort to look up he raised the upper lid somewhat, but the eyes remained in the same position as before. When anyone standing beside him spoke to him unexpectedly he turned both eyes toward that side in a normal way, but the eyes did not remain in this position, they soon returned to their former one. When he lay on his back and was thus accosted from a direction above his head or below his feet the eyes turned in the same manner up or down. The eye followed the movements of a hand before it sometimes, but quickly wearied. When one stood before him, told him to look him in the eye, and turned his head laterally with his hands the eyes of the patient remained in the position of fixation, thus moving laterally. The patient complained of diplopia, but the double images could not be brought into a system. There was no nystagmus. Vision was 1. The visual field and fundus were normal. The patellar and sole reflexes were exaggerated, likewise the sensibility to pain, tactile and thermic irritations. The temperature and pulse were normal. Injections of bicyanate of mercury, iodide of potassium internally, and a vesicatory to the occiput were ordered. After nine days the normal mobility of the eyes was restored. The incapacity to excite movements of the

eye through his will with preservation of mobility through fixation of moving objects and as a reflex to sensations of hearing shows that the oculomotorius nucleus, as well as the reflex tracts from the optic nerves to the co-ordination centre of the motor nerves of the eye, were intact in this case and that only the tract from the cortex to the motor nerves of the eye was interrupted. The focus of disease, probably a hemorrhage caused by syphilitic changes in the vessels, was probably situated somewhat above the corpora quadrigemina. Lewitzky thinks that similar cases may easily have been recorded as simple ophthalmoplegias after a superficial examination. Three types of paralyses of the ocular muscles are to be distinguished: 1. The common ophthalmoplegia, in which paralysis of all kinds of movement, simple, associated, reflex, and voluntary, is present in the sphere of the affected nerves. 2. Paralysis of the associated movements, in which these movements can be called forth neither by the will nor as a reflex. 3. Paralysis of the associated movements to the impulse of the will with preservation of reflex movements.

HIRSCHMANN.

KNAPE (167, **Choked disk and its pathogenesis**) thinks that the central vein of the retina is compressed in its course through the dural sheath by the œdematous sheath and thus produces choked disk. He has examined 10 cases of choked disk pathologically, 6 associated with tumor cerebri, 1 with chronic nephritis, 1 with acute myelogenous leucæmia, 1 with the hemorrhagic diathesia, and 1 with a vascular tumor of the orbit, and in 2 cases found distinctly a compression of the vein in the œdematous dural sheath. In the other cases this was not found partly because in some the optic nerve was too short, partly because when he undertook these examinations his attention had not been directed to the course of the vein at this place. But in all cases he found œdema in the dural sheath. Nine of the ten were inflammatory, one, associated with the vascular tumor of the orbit, showed no sign of inflammation. HELLGREN.

VINCENT (168, **Thalamic syndrome with hemianopsia cerebellar troubles, and vaso-asymmetry**) reports the case of a man 64 years old who presented the following symptoms of thalamus-opticus disease: Disturbances of sensibility and

paresis of the left half of the body, left homonymous hemianopsia without hemianopic pupillary reaction, swaying of the body while walking, and disturbance of the co-ordinated movements on the left side, and vasomotor disturbances similar to those observed by Babinsky in diseases of the medulla oblongata. He supposes that in this case the lesion was situated below the optic thalamus. BERGER.

The case of CHANCE (169, **Herpes zoster ophthalmicus with involvement of the cornea and oculomotor paralysis**) showed irregular involvement of the muscles supplied by the third nerve accompanying the eruption on the skin and later on the cornea. He attributed the condition to toxemia which caused paresis through disturbances in the nuclear regions, although the pupillary fibres were not affected. There was complete recovery. ALLING.

POSEY'S (170, **Report of a case of keratitis probably due to metastatic gonorrhœa**) patient had suffered twelve years before from an inflamed eye following an attack of urethritis. The present condition was also preceded by an outbreak of gonorrhœa. A smear from the cornea showed abundant gonococci. The cornea had the appearance of a vesicular keratitis engrafted on an old opacity, the central portion being quite opaque and the seat of six to eight vesicles. Injections of antigonococcic serum were tried daily for more than a month but this and local treatment failed to control the process. After two months the patient was discharged with dense opacities. ALLING.

VIII.—**Ophthalmic Surgery.** By CHARLES H. BEARD, M. D., Surgeon to the Illinois Charitable Eye and Ear Hospital, Chicago, etc. With 9 plates showing 100 instruments and 300 other illustrations. 674 pages. Philadelphia: P. Blackiston's Son & Company, 1910. Price, $5.00 net.

The author, based on a personal experience of 26 years, endeavors to describe the most valued operative measures in ophthalmic surgery of all countries. That he has admirably succeeded but a brief survey of the book will show. The two introductory chapters are on Para-operative Technique and Instruments and their Management. The author advises that the nurses and aids in the operating room wear gloves while the surgeon and his assistant have mouth and beard covered by masks. The operating room should have a north window inclined at an angle of 30° to 45° inward, whereby corneal reflections are less troublesome. A good quality of white mosquito netting fulfils all requirements of a good and cheap bandage. Venesection is described and its use praised to lower high blood pressure before operations for cataract and glaucoma. A weak solution of dionin is added to all subconjunctival injections; the local reaction is thereby advantageously increased. The author's remarks on Instruments are timely, emphasizing the fundamental importance of efficiency and simplicity, and the value of constant practice in manipulation is wisely insisted upon. The chapter on the Ocular Muscles gives a clear description of the various methods in favor. The author rejects simple tenotomy and performs a button-hole operation only preceding the advancement. Of the methods for advancement, the author's own method seems simple, practical, and to have given good re-

sults. The operations for ptosis give an instructive survey of the operations and their guiding principles for this difficult and generally unsatisfactory condition. Attention is drawn to the author's excellent procedure. In conclusion (p. 249) the importance of a correct diagnosis is emphasized. In mild degrees several methods give satisfactory results, in the high degrees it is best to use a method which combines two or more features. The author's large experience in entropion operations has led him to adopt an operation which is made up of a number and is known as the "Altogether." This consists in canthoplasty, Hotz's method, counter grooving of the tarsus, tucking of the tarso-orbital fascia, and intermarginal mucous graft. In operations for cataract Dr. Beard prefers simple extraction. The section is at the sclerocorneal junction with conjunctival flap; the capsule is opened peripherally with a cystotome. Intraocular irrigation is not favored. The accidents and complications are fully treated. "Since adopting the Graefe knife and the extreme peripheral place of entry, discission has lost all of its terrors." The final chapters are on Orbital Operations and Removal of Foreign Bodies from the Interior of the Eye.

Dr. Beard's book is an excellent guide to the Surgery of the Eye. Its teachings are safe and based on sound judgment. It occurs to the reviewer that in future editions the following operations should be added: Toti's operation for partial excision of the lacrymal sac with resection of the lacrymal bone, La Grange's operation for chronic glaucoma, and the operations for orbital complications of disease of nasal accessory sinuses. The illustrations are clear and adequate.

A. K.

IX.—**Refraction and How to Refract.** By JAMES THORINGTON, M. D., Philadelphia. Fifth edition. 251 illustrations. 324 pages. Philadelphia: P. Blakiston's Son & Company, 1910. Price, $1.50 net.

A new edition of this well-known and popular text-book brings a revision of the subject-matter, and an addition to the number of illustrations. It continues to be one of the best books on the subject. A. K.

X.—**Diseases of the Eye.** A Handbook of Ophthalmic

Practice for Students and Practitioners. By G. E. DE SCHWEINITZ, M. D., Philadelphia. 351 illustrations. 945 pages. Sixth edition, thoroughly revised. Philadelphia and London: W. B. Saunders Company, 1910. Price, $5.00 net.

In this new edition many new subjects have been added and certain parts have been rewritten. Reference is made to vaccine and serum therapy, to the relation of tuberculosis to ocular disease and to the value of tuberculin as a diagnostic and therapeutic agent, thus bringing the book well abreast of the present standpoint of general medicine. Dr. Edward Jackson has revised his chapter on the Shadow Test and its Application. Dr. Alexander Duane has aided in revising the chapter on The Movements of the Eyeballs and their anomalies. The book in its present form more than ever represents the best American Text-book on the Eye and reflects great credit on its talented and industrious author.

A. K.

Fig. 1.

Fig. 2.

M. Nurenin gez.

***Rubert**, Zur hyalinen Degeneration der Hornhaut.*

Kgl. Universitätsdruckerei H. Stürtz A.G. Würzburg. Verlag von J.F. Bergmann, Wiesbaden.

Fig. 3.

Fig. 4.

J. Mokuschenko gez.

***Rubert**, Zur hyalinen Degeneration der Hornhaut.*

Kgl. Universitätsdruckerei H. Stürtz A.G. Würzburg. Verlag von J.F. Bergmann Wiesbaden.